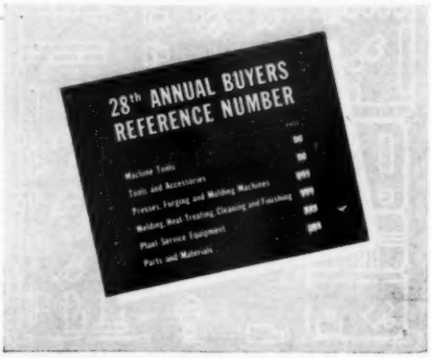
AMERICAN MACHINIST

January 22, 1941



Plans—*Diagrammatic floor layouts mark industry's expansion for the defense program. The next step is the selection of plant equipment*

MASON BRITTON, Vice-Chairman
FRED H. COLVIN, Editor Emeritus
BURNHAM FINNEY, Editor
KENNETH H. CONDIT, Consulting Editor
JOHN HAYDOCK, Managing Editor
BEN C. BROSHEER — WILLIAM J. HARGEST
WILLIAM W. HORINE — RICHARD K. LA BAN
RUPERT LE GRAND — RAYMOND R. WIESE
Detroit — Chicago
PAUL WOOTON — CHAS. F. McREYNOLDS
Washington — Los Angeles
N. O. WYNKOOP, Publisher
W. E. KENNEDY, Manager

McGraw-Hill Publishing Company, Inc.

Publication office, 99-129 North Broadway, Albany, N. Y. Editorial and executive offices, 330 West 42nd Street, New York, N. Y. Branch offices: Chicago, 520 North Michigan Ave.; San Francisco, 68 Post Street; Aldwych House, Aldwych, London, W. C. 2; Washington; Philadelphia; Cleveland; Detroit; St. Louis; Boston; Atlanta.

JAMES H. McGRAW
Founder and Honorary Chairman
JAMES H. McGRAW, Jr., President — HOWARD EHRLICH, Executive Vice-President
MASON BRITTON, Vice-Chairman — B. R. PUTNAM, Treasurer
D. C. McGRAW, Secretary — J. E. BLACKBURN, Jr., Director of Circulation

VOLUME 85 NUMBER 2

AMERICAN MACHINIST. Copyright 1941 by McGraw-Hill Publishing Co., Inc. Published every other Wednesday, price $1.00 this copy. Allow at least ten days for change of address. All communications about subscriptions should be addressed to the Director of Circulation, 330 West 42nd Street, New York, N. Y. Subscription rates — United States, Canada, Mexico and Central and South American countries $5.00 a year, $8.00 for two years, $10.00 for three years. All other countries $8.00 a year, $13.00 for two years, $16.00 for three years. Entered as second class matter, September 29, 1936, at Post Office, Albany, N. Y., under the act of March 3, 1879. Printed in U.S.A. Cable address: "McGrawhill, New York." Member of A.B.P. Member of A.B.C.

A McGRAW-HILL PUBLICATION

PRINTED IN U.S.A.

28th BUYERS REFERENCE NUMBER

CONTENTS

What's in This Issue 67
Arming America's Industry 69
Machine Tools 73
Tools and Accessories 175
Presses, Forging and Molding Machines 237
Welding, Heat-Treating, Cleaning and Finishing 267
Plant Service Equipment 297
Parts and Materials 333

INDEXES

Classified Index of Equipment 71
Directory of Contract Work Facilities 367
Where-To-Buy Directory 401

DEPARTMENTS

Reference Book Sheet 91
News of the Industry 346b

HOW TO USE THIS ISSUE

For information on new products: Editorial illustrations and descriptions summarize developments as described in Shop Equipment News pages during the past year. More than 1000 items classified in six big sections as indicated on Page 1.

To find names of leading manufacturers of a desired product: Use the Where-To-Buy Directory section for classified listings under more than 550 headings. Where a manufacturer's name is starred you can find additional information in an advertisement in this issue.

To locate extra help from outside contract shops or from equipment not now in use: A Directory of Contract Work Facilities and advertising of used equipment available for immediate delivery, starting on Page 367.

To check on a manufacturer's complete line: Advertising pages contain detailed data on individual companies. These pages, too, are classified in the six sections listed on Page 1.

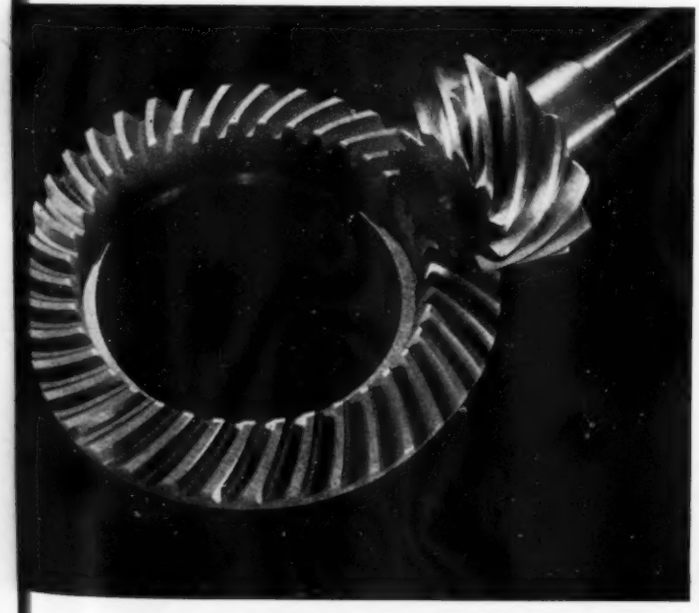
For year-round reference: This issue is designed to help you all through 1941 whenever you are buying. Use it as your equipment and supplies handbook throughout the year.

The 28th Annual Review & Catalog Number of

AMERICAN MACHINIST

A battery of new Gleasons in a modern automobile plant

DO YOUR PRODUCTION TIMES EQUAL THESE?



Automotive Hypoid Gear and Pinion
11/39 Teeth, 1½" Offset
Gear — 4½ D. P., 1¼" Face Width

Rough-cut gear teeth on No. 11 Gear Rougher
11½ gears per hour per machine

Finish-cut gear teeth on No. 11 Single-Cycle Finisher
11½ gears per hour per machine

Rough-cut pinion teeth on No. 15 Pinion Rougher
16 pinions per hour per machine

Finish-cut pinion teeth on No. 16 Hypoid Generator
9 pinions per hour per pair of machines

Note — pieces per hour based on hypoid pair at left and a quality better than ever before.

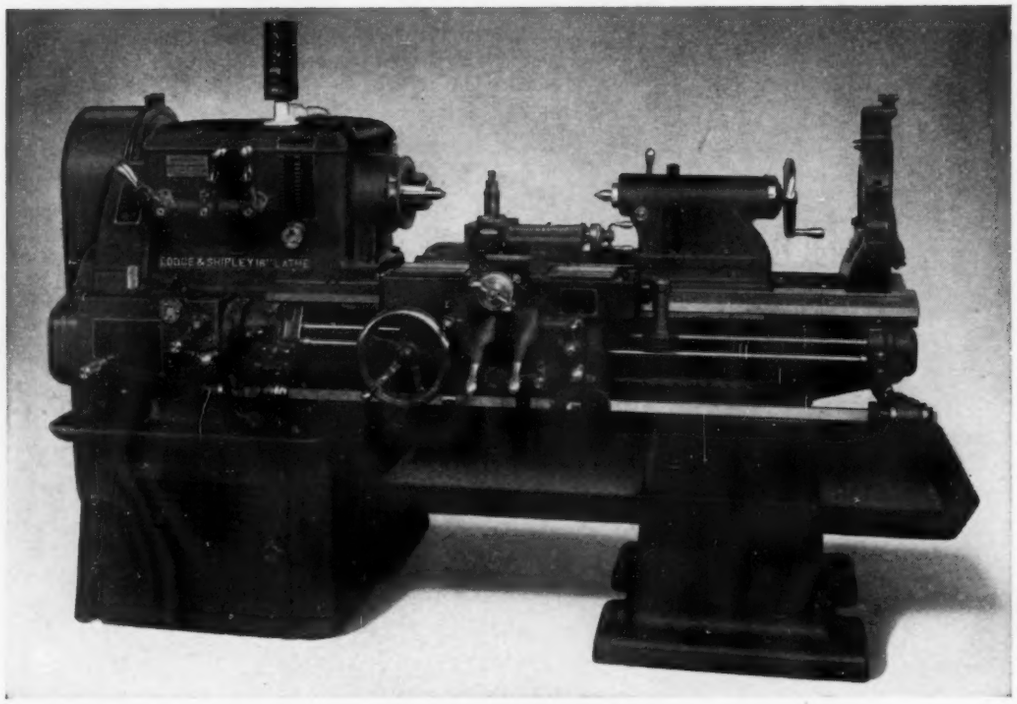
To cut your spiral bevel and hypoid gears faster, better and cheaper, modernize with new Gleasons. Send prints today for our production estimate on your job.

GLEASON

GLEASON WORKS

Builders of Bevel Gear Machinery for Over Seventy-five Years

1000 UNIVERSITY AVENUE, ROCHESTER N.Y. U.S.A.



16" SELECTIVE HEAD ENGINE LATHE

LATHES EVERY

ENGINE LATHES

TOOL ROOM LATHES

MANUFACTURING LATHES

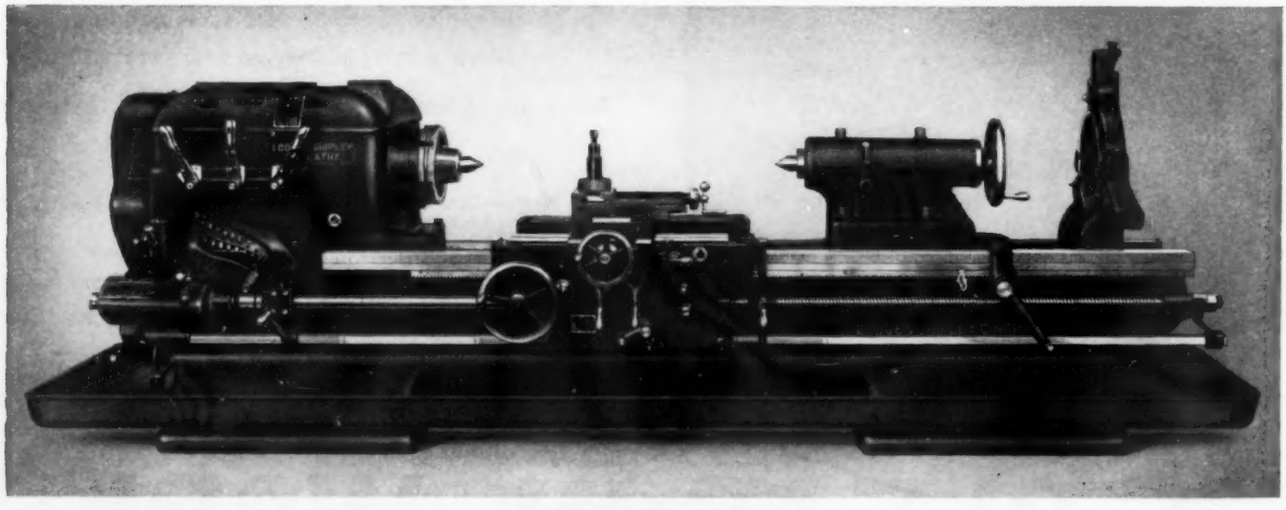
LODGE & SHIPLEY
CINCINNATI

ENGINE LATHES Designed and manufactured to set up new standards of accuracy, production and smooth operation, the Lodge & Shipley Selective Head Engine Lathe represents the ultimate of modern machine tool design.

In plants where the production work is extremely varied, these machines will find a wide application and will earn for themselves a reputation for profitable operation and ease in handling.

TOOL ROOM LATHES The Lodge & Shipley Tool Room Lathe is a modern production tool of wide range versatility, flexibility and production. Offering faster precision turning with no sacrifice in accuracy, this lathe has proven conclusively that it has the power, stamina and convenience to meet the most comprehensive needs of the tool room.

MANUFACTURING LATHES The Manufacturing Lathe is an Engine Lathe with attachments that has time-saving features that effect a considerable reduction in machining costs. The Manufacturing Lathe is especially suited to the shop where jobs are varied and where all 'round flexibility coupled with semi-automatic productivity are required.



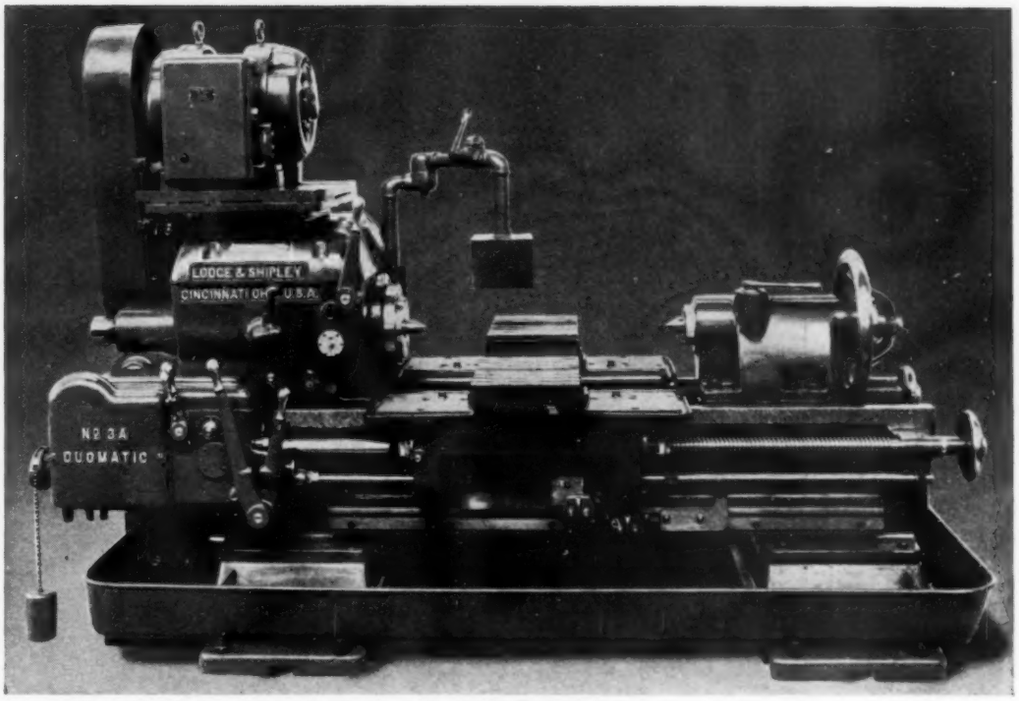
24" SELECTIVE HEAD LATHE

FOR PURPOSE

SPECIAL LATHES

DUOMATIC LATHES

OIL COUNTRY LATHES



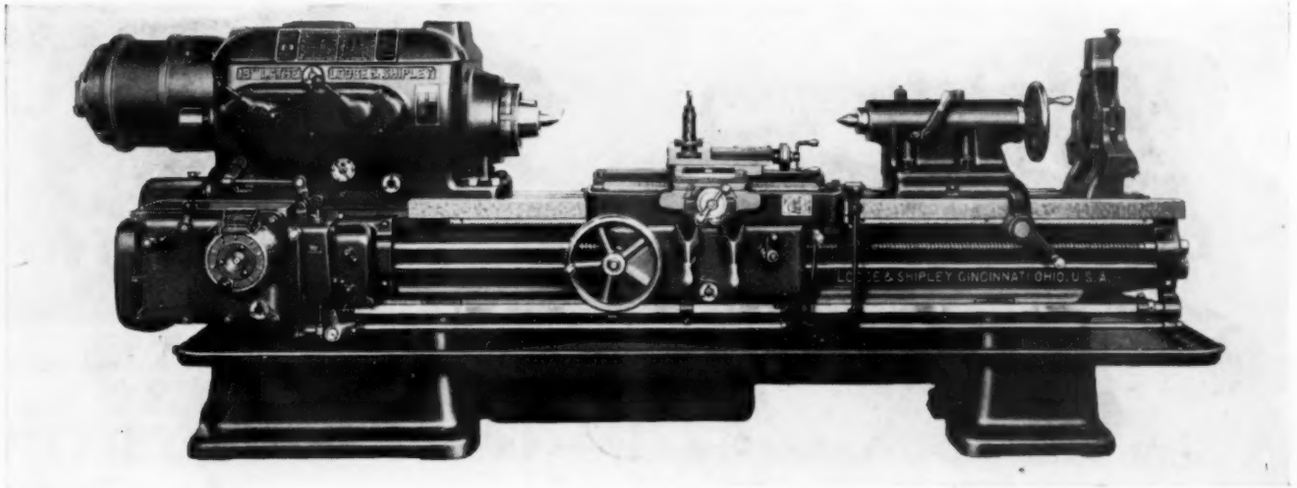
NO. 3A DUOMATIC LATHE

MACHINE TOOL CO.
OHIO, U.S.A.

SPECIAL LATHES In addition to the machines illustrated, Lodge & Shipley builds special lathes and attachments for lathes that handle a wide variety of work. Bring your lathe problems to Lodge & Shipley and get the benefit of the years of experience that has been gained since 1893.

DUOMATIC LATHES The No. 3A Duomatic is a general purpose full automatic cycle lathe providing independent front and rear carriages and tool slides capable of straight or angular facing in or out and turning or boring. These cycles are obtainable either front or rear. Simple adjustments quickly determine the desired cycles minimizing change-over time.

OIL COUNTRY LATHES The record of profitable production even under adverse conditions, which has featured the Lodge & Shipley Oil Country Lathes has won them universal acceptance in oil tool shops. Larger and heavier, this new lathe is a modern tool designed to meet present and anticipate future requirements of oil country work.

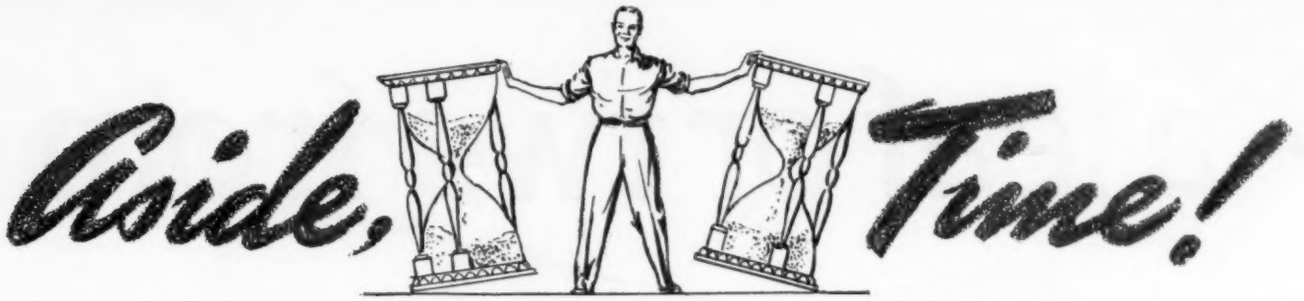


18" SELECTIVE HEAD TOOL ROOM LATHE

SAVE WITH A *New* CINCINNATI

Machine—CINCINNATI No. 1-12 Plain Automatic Milling Machine.
Part Name—Driving stud for take-up lever.
Material—Steel.
Operation—Mill ends to length.

Stock Removal—$\frac{1}{32}$" each end.
Feed—10¾" a minute.
Cutter Speed—150 feet a minute.
Production—Approximately 136 parts an hour.



HERE COMES THE 1-12

IT'S usually hard to show a big saving in making small parts for intricate mechanisms. The smallness of the part, the short lengths of cuts, and the ease of handling all combine to defy improvement over any existing process of manufacture. In some cases, however, like the equipment illustrated on the opposite page, a new idea plus a new machine make the old method an indefensible expense.

The part is a driving stud for a take-up lever in an industrial sewing machine. In each end of the tandem fixture, four parts are milled at one time on a CINCINNATI No. 1-12 Milling Machine; climb cutting on one end and conventional on the other. ***Time per piece was reduced from 2½ minutes to 23 seconds***, or, in other words, 6½ for 1.

Rapid table traverse of 300" a minute plays a big part in this remarkable saving. Then there's the full automatic table feed cycle . . . spindle speeds up to 1500 r. p. m. . . . table feeds from ¾" to 30" a minute . . . exceptionally accurate table trip . . . well-balanced design that invites the heaviest cut the cutter will stand. Little wonder that the CINCINNATI 1-12's are making such satisfying records in reducing the cost of milling operations on small parts.

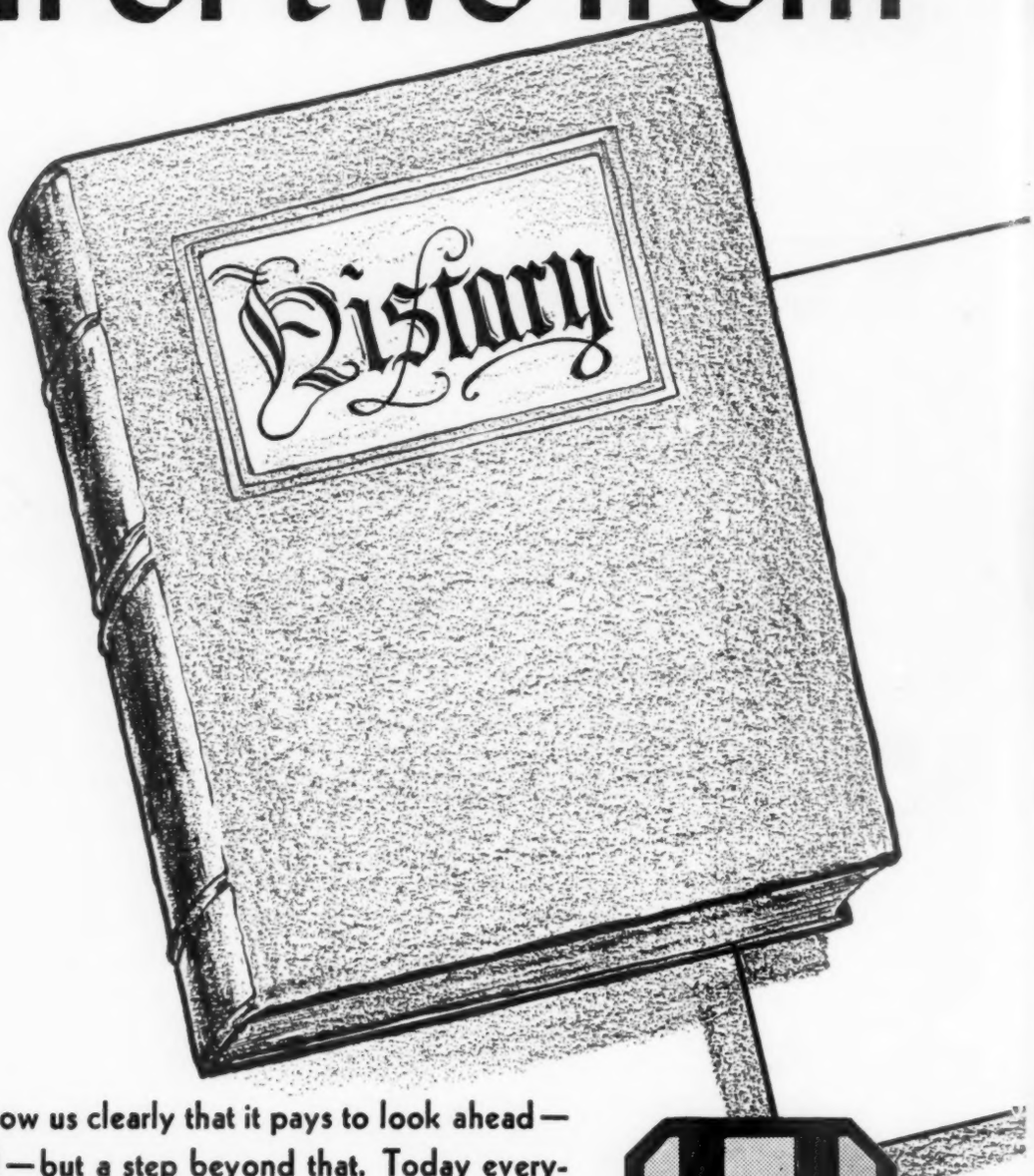
If you would like the illustrated circular, No. M-848, we will be glad to forward a copy to you.

CINCINNATI

THE CINCINNATI MILLING MACHINE CO.

CINCINNATI, OHIO, U. S. A.

..a leaf or two from



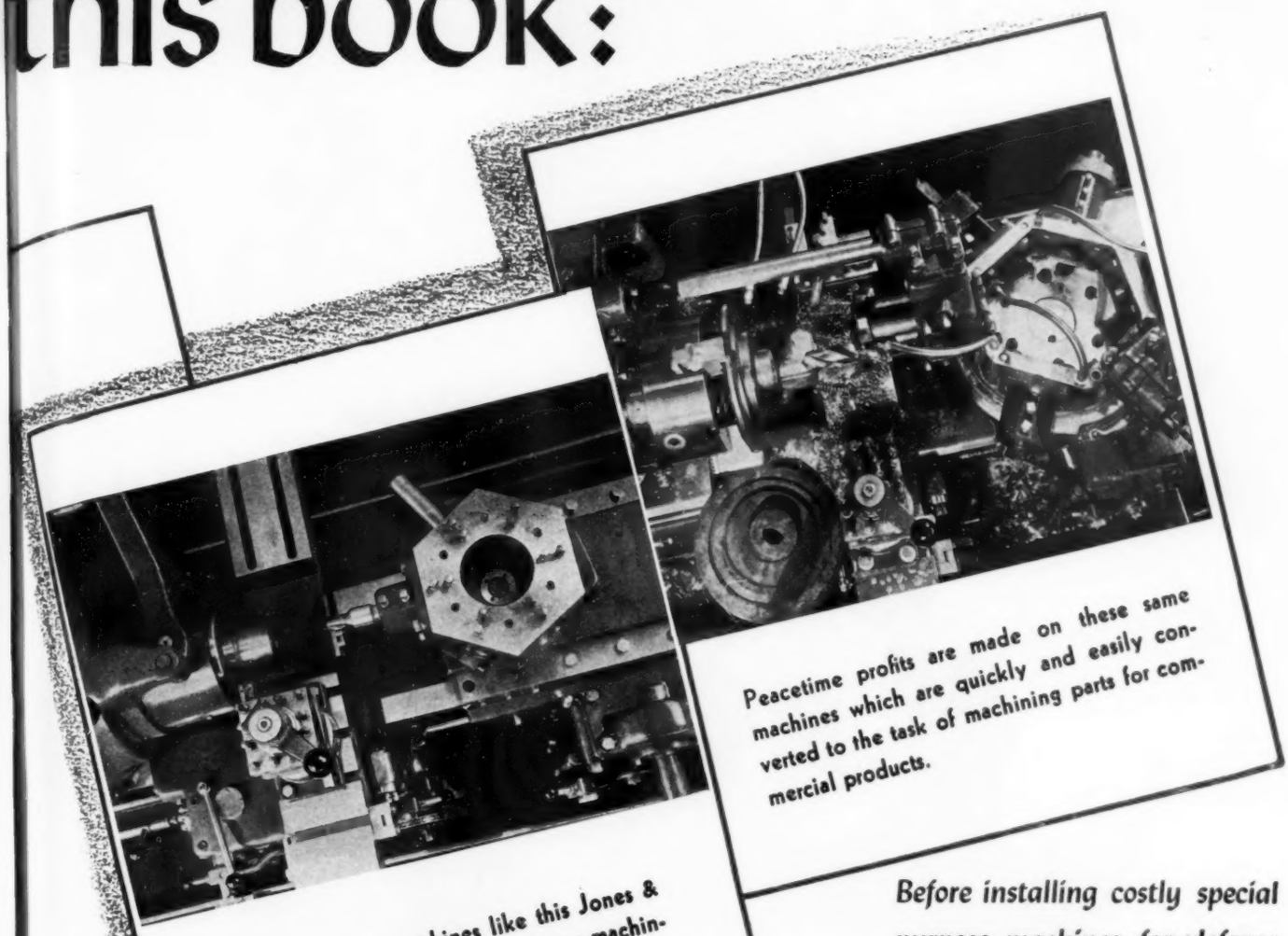
HISTORY'S lessons show us clearly that it pays to look ahead—not merely one step ahead—but a step beyond that. Today everyone agrees our first step is to arm—and arm at once. Versatile, rigid, precise and highly productive Jones & Lamson equipment will speed our defenses—and tomorrow, when this emergency is over, your same Jones & Lamson machines will enable you to take the next logical step—toward sound peacetime profits based on rock bottom production costs.

Profit Producing Machine Tools

JONES & LAMSON

Springfield, Vermont, U.S.A.

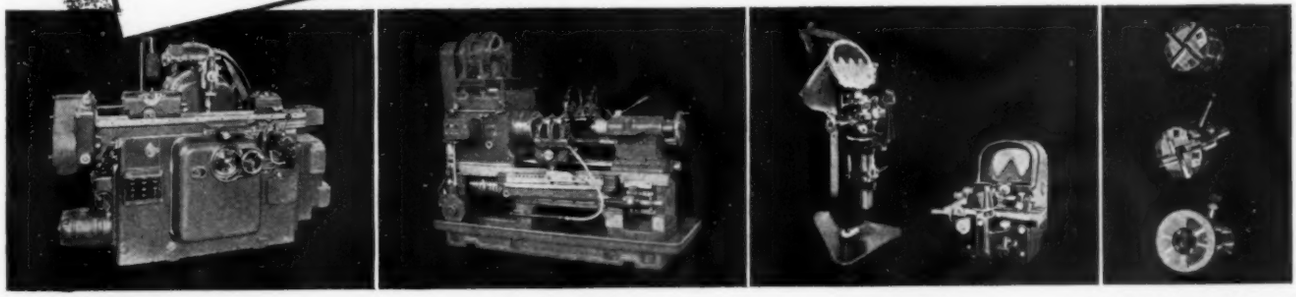
this book:



Peacetime profits are made on these same machines which are quickly and easily converted to the task of machining parts for commercial products.

Defense demands machines like this Jones & Lamson Universal Turret Lathe shown machining the base end of a shell.

Before installing costly special purpose machines for defense work see what these versatile Jones & Lamson Machines can do for you.



AUTOMATIC THREAD GRINDERS

FAY AUTOMATIC LATHES

OPTICAL COMPARATORS

AUTOMATIC OPENING DIE HEADS

MACHINE COMPANY

MANUFACTURERS OF SADDLE & RAM TYPE UNIVERSAL TURRET LATHES . . . FAY AUTOMATIC LATHES . . . AUTOMATIC DOUBLE-END MILLING & CENTERING MACHINES . . . AUTOMATIC THREAD GRINDING MACHINES . . . COMPARATORS . . . TANGENT AND RADIAL, STATIONARY AND REVOLVING DIES AND CHASERS.

"The Most Complete Compilation

FELLOWS

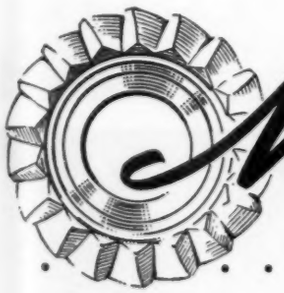
MACHINES AND TOOLS FOR GEAR PRODUCTION

# of Practical Machining Methods FOR GEARS ... and other parts"

Many plant managers and gear production men have written us about the new Fellows catalogue, stating how they use it to select the most economical method for producing a large variety of gears and other parts. This catalogue covers more than machines and their method — it presents vividly the reasons why a complete and coordinated line-up of machines and tools achieve greater overall economy than is otherwise possible.

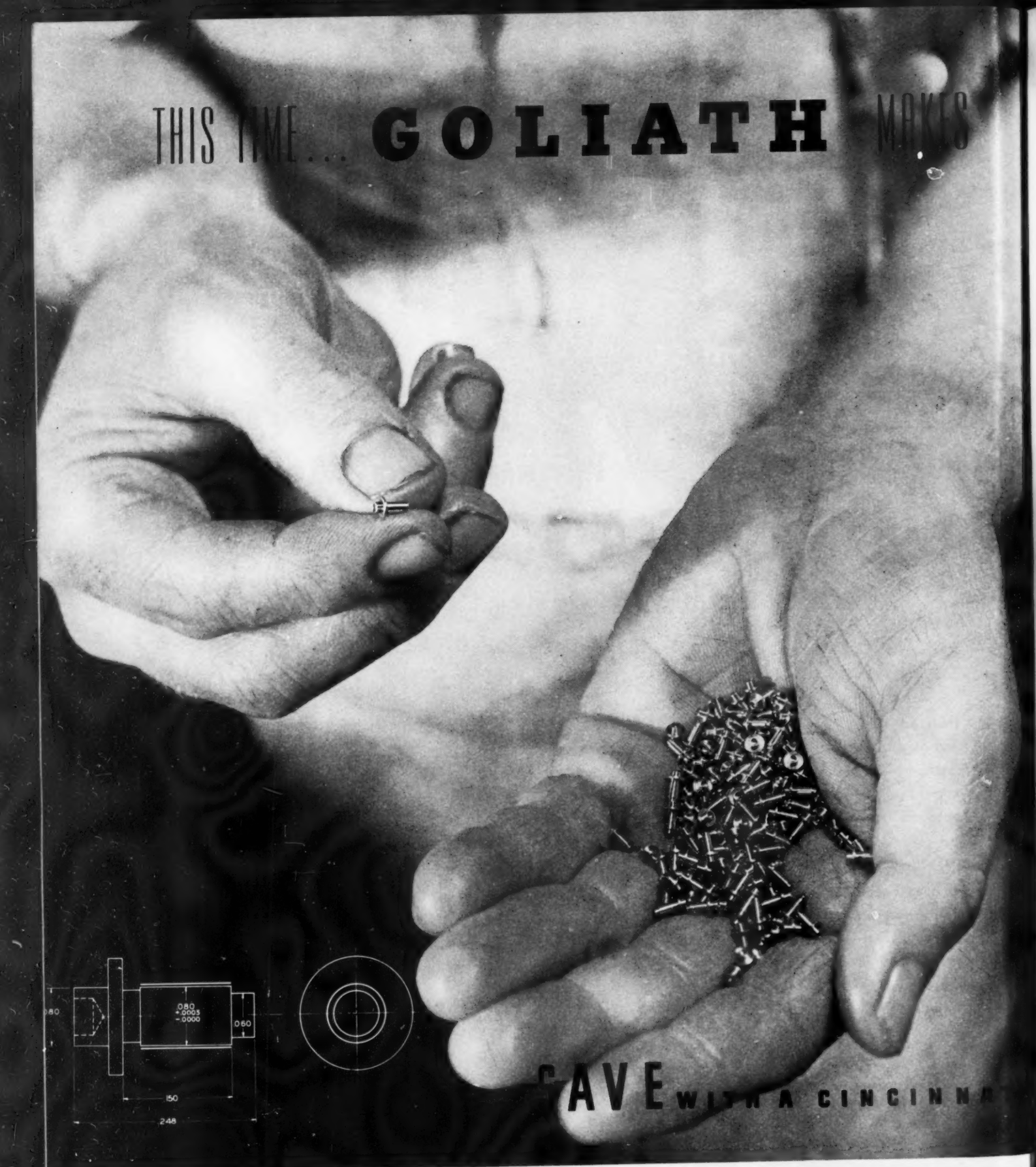
With gear requirements becoming more exacting, a closer study of detailed operations and their integrated relationship is highly essential. You will find much of interest and value in this new booklet—and your request for a copy will in no way obligate you—a request on your business stationery will receive our prompt attention—write: The Fellows Gear Shaper Company, 78 River Street, Springfield, Vermont.

616 FISHER BUILDING, DETROIT, MICHIGAN • 640 WEST TOWN OFFICE BLDG., CHICAGO, ILLINOIS



Method

. . . . . FROM BLANK TO FINISHED GEAR



+.0005
-.0000

Both Centerless and Center Type Grinders

LITTLE DAVID TOE THE MARK

"GOOD things come in small packages," as little David so aptly proved when he slew the mighty Goliath.

But this time Big Goliath turned the tables on the little fellow. Grinding a lever stud, only .248" long, for movie cameras, the CINCINNATI No. 2 Centerless grinds the long bearing diameter at the rate of **300 pieces per hour.**

This production is maintained despite the fact that the lever stud is so small the operator must use a loading mandrel to insert the part against the grinding wheel for finishing.

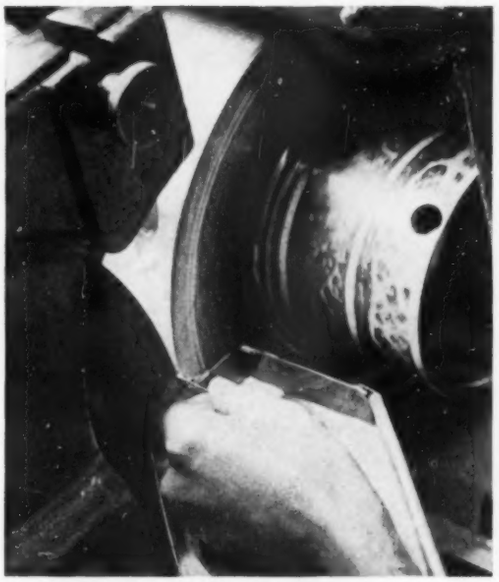
Here is the complete story of this job:

Part—lever stud for movie camera shutter
Material—nickel silver alloy
Limits—+.0005"
—.0000"
Stock removal—.006"—.007"
Finish—good commercial
Production—300 pieces per hour

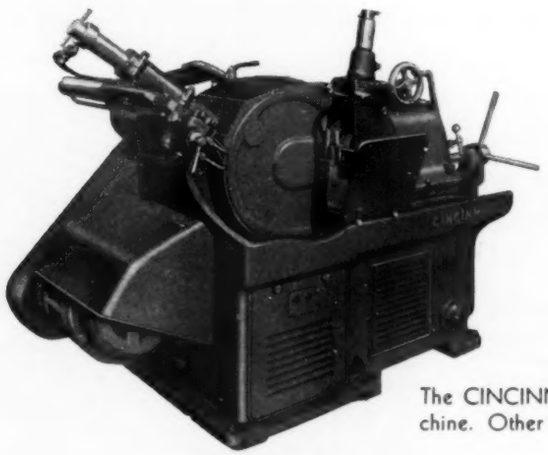
On big or small parts, metallic or non-metallic, the CINCINNATI Centerless will do the job you want at a **saving.**

If it's accuracy, smooth finish, rapid production and lower grinding costs you're looking for, **it's Centerless all the way!**

Investigate these machines today. Literature will be sent at your request.



The lever stud is so small that the operator places it on a loading mandrel and uses the infeed method of grinding.



The CINCINNATI No. 2 Centerless Grinding Machine. Other Centerless sizes are Nos. 3, 4, 5 and 6.

CINCINNATI GRINDERS INCORPORATED

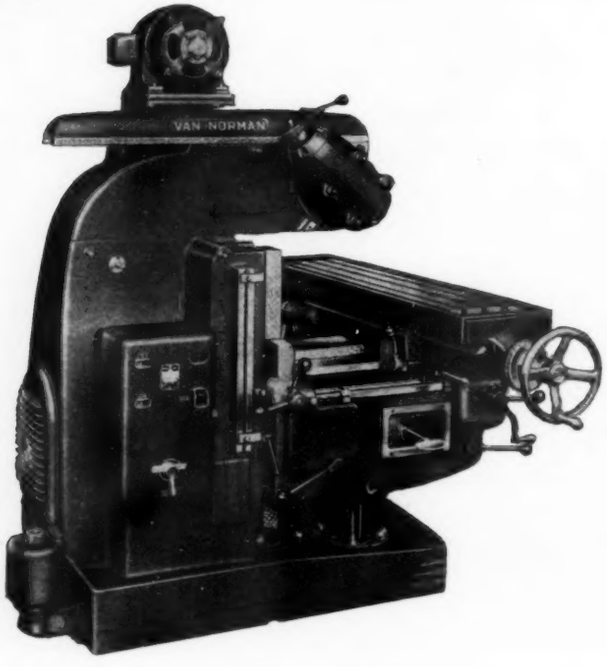
CINCINNATI, OHIO, U. S. A.

CINCINNATI

A SYMBOL OF A DEFINITE STANDARD OF WORTH

No. 2-S
PLAIN AND UNIVERSAL
Table: 50" x 12"
18 Speeds: 25 — 1250 rpm
18 Feed Changes

VAN NORMAN MI L



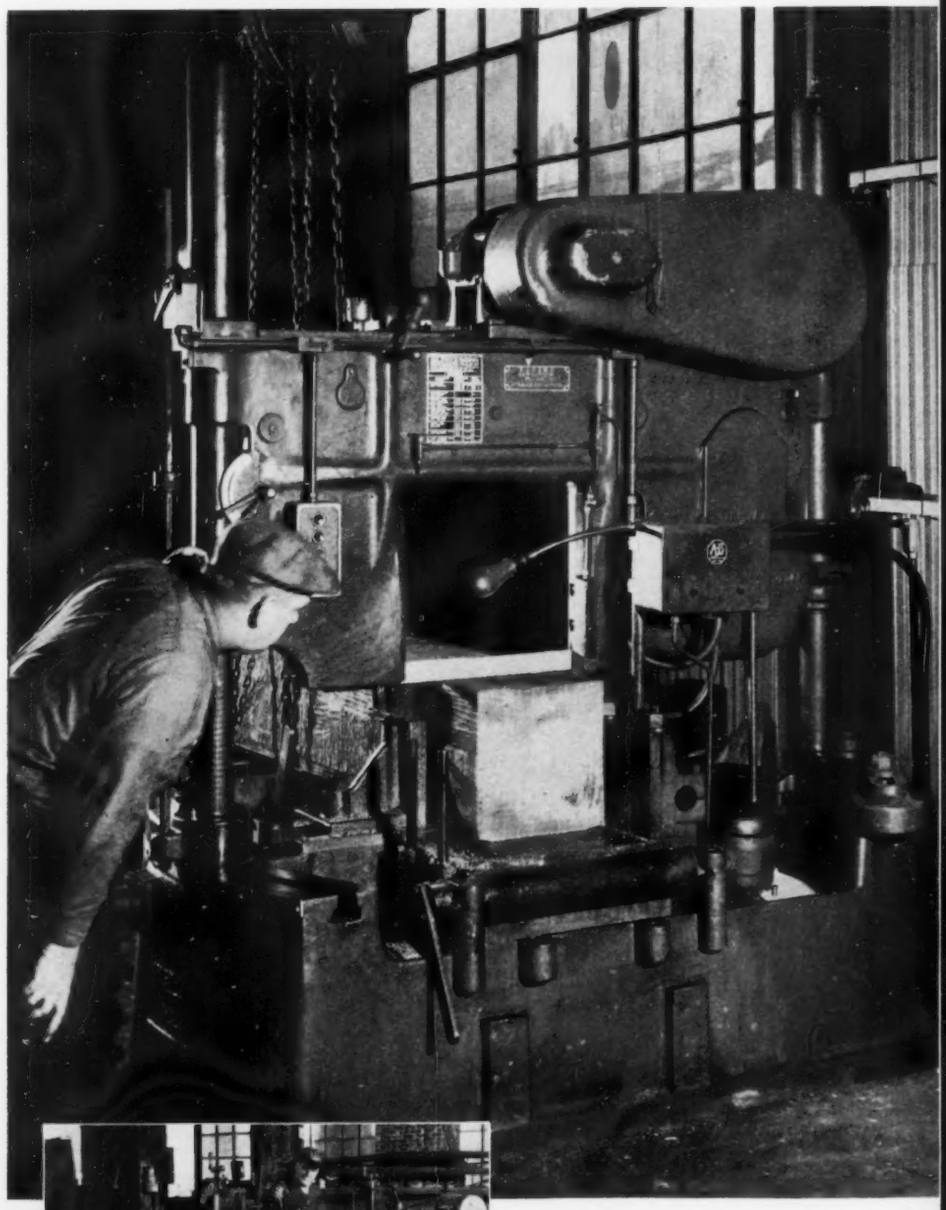
No. 26 & No. 36
RAM TYPE UNIVERSAL
Table: 50" x 12"
Range: 28" longitudinal,
12" cross, 18" vertical
(No. 36 Table: 58" x 13")

LLING MACHINES...

VAN NORMAN engineers have developed a number of important improvements in milling-machine construction, designed to accommodate a wider range of work . . . to simplify and speed the completion of each piece . . . to reduce costs and increase profits. Many of these features are shared, in common, by the new Van Norman Ram-Type Universals and Knee-Type Horizontals. Especially noteworthy are the streamlined columns . . . fingertip positive directional controls of power feeds, both front and rear . . . 6-way rapid traverse for table, knee and saddle . . . wide selection of speeds and feeds . . . large dials . . . automatic lubrication of all moving parts. And both types of machines have the power, weight and rigidity to assure accuracy on heavy cuts at high speeds. Get the detailed picture of what these modern Van Norman Millers can do for you. Write for illustrated bulletins.

Van Norman Machine Tool Co., Springfield, Mass.

MARVEL SAWS



Photographed at Charles E. Larson & Sons, Inc., Chicago.

● A MARVEL No. 18 giant Hydraulic Hack Saw for the big jobs, and a pair of MARVEL 9A Automatics for exceptional speed, answer all the cutting-off problems of Charles E. Larson & Sons, Inc., Chicago.

It takes a lot of cutting-off to keep up with the rows of great hammers in this large modern, fully equipped forge plant, but it's for just such heavy-duty, high speed, continuous operation that these all-ball-bearing MARVEL SAWS were designed.

Whatever your metal sawing problems, there are MARVEL Saws exactly suited to your needs. The local MARVEL Sawing Engineer will call upon request, study your metal-cutting problems and make recommendations as to cutting-off methods, equipment and costs.

ARMSTRONG-BLUM MFG. COMPANY

"The Hack Saw People"

5700 Bloomingdale Ave., Chicago, U. S. A. Eastern Sales: 199 Lafayette St., New York, N. Y.

ARMSTRONG

Increase profits with more ARMSTRONG TOOLS

There is no easier, quicker or more efficient way to step up output and profits than by increasing your stock of ARMSTRONG TOOL HOLDERS and TOOLS.

With the correct ARMSTRONG TOOL HOLDERS for every operation on lathes, planers, slotters and shapers, you are permanently tooled up and ready for work on a moment's notice. You end all delays of tool forging and tool dressing—"Save: All Forging, 70% Grinding and 90% High Speed Steel". Moreover, you can safely step-up speeds and feeds to the limit. ARMSTRONG TOOL HOLDERS have the strength for, and their improved designs make efficient speeds far beyond those commonly used.

The better tool balance and greater strength of ARMSTRONG WRENCHES make them the finest machine wrenches and assembly wrenches obtainable. They make work easier and faster.

Other ARMSTRONG TOOLS that increase output and profits are:

ARMSTRONG Drop Forged "C" Clamps—7 types, all sizes.

ARMSTRONG Drop Forged Lathe and Milling Machine Dogs, 11 types, all sizes.

"ARMSTRONG BROS." Pipe Tools—the most complete line manufactured.

ARMSTRONG Ratchet Drill—11 improved types.

ARMSTRONG Drop Forged Setting-up Tools and Machine Shop Specialties.

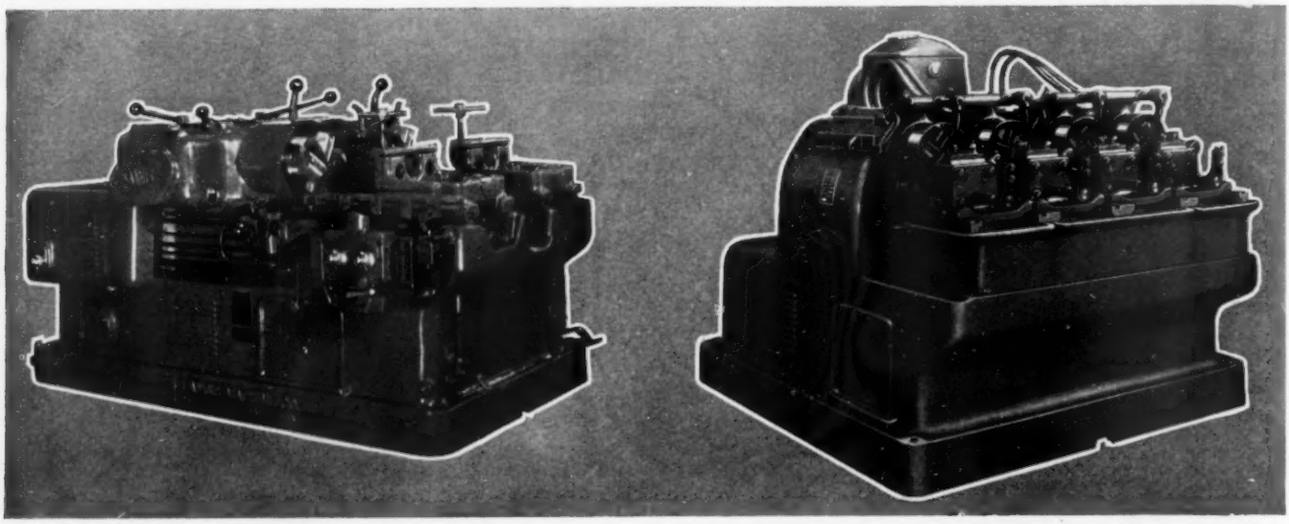
ARMSTRONG BROS. TOOL CO.

"The Tool Holder People"

315 N. Francisco Ave., Chicago, U. S. A.

Eastern Warehouse & Sales:
199 Lafayette St., New York

The Key to National Defense



THE LANHYDRO (HYDRAULICALLY CONTROLLED) TURNING & THREADING

SEMI-AUTOMATIC THREADING MACHINE

. . the complete line of LANDMATIC, LANCO, and LANDEX Die Heads—for all kinds of external threading operations—and, LANDIS Collapsible Taps, for Internal Threading—provides a complete THREAD CUTTING service. A service which assures greater PRODUCTION —finer ACCURACY and Increased PROFITS.

THROUGH 1941 BUY LANDIS

The* LANDIS *Line

STANDARD THREADING MACHINES
LANDMACO THREADING MACHINES
BOLT FACTORY THREADERS
AUTOMATIC FORMING AND THREADING MACHINES
PIPE THREADING AND CUTTING MACHINES
PIPE AND NIPPLE THREADING MACHINES
ROLLER PIPE CUTTERS
CHASER GRINDERS
ROTARY BOLT THREADING DIE HEADS
STATIONARY PIPE DIE HEADS
LANDMATIC HEADS FOR TURRET LATHES
LANDEX HEADS FOR AUTOMATIC SCREW MACHINES
LANCO HEADS FOR HAND-OPERATED THREADING MACHINES
LANDIS COLLAPSIBLE AND ADJUSTABLE TAPS

LANDIS MACHINE COMPANY Inc. Waynesboro Pennsylvania

Through 1941 • Machine Tools

In THREADING *it's*

LANDIS *for assured*

ACCURACY — ECONOMY — PRODUCTION

LANDIS THREAD CUTTING MACHINES, DIE HEADS and COLLAPSIBLE TAPS are recognized universally for their ability to produce threads of the finest accuracy at the lowest possible Threading Cost.

Through 1941 as our Defense Program reaches its peak you cannot do better than to depend on LANDIS to expedite your thread cutting operations in the most efficient and economical manner.

LANDIS THREAD CUTTING MACHINES *plus*..

THE LANDIS AUTOMATIC FORMING & THREADING MACHINE

THE LANDMACO THREADING MACHINE

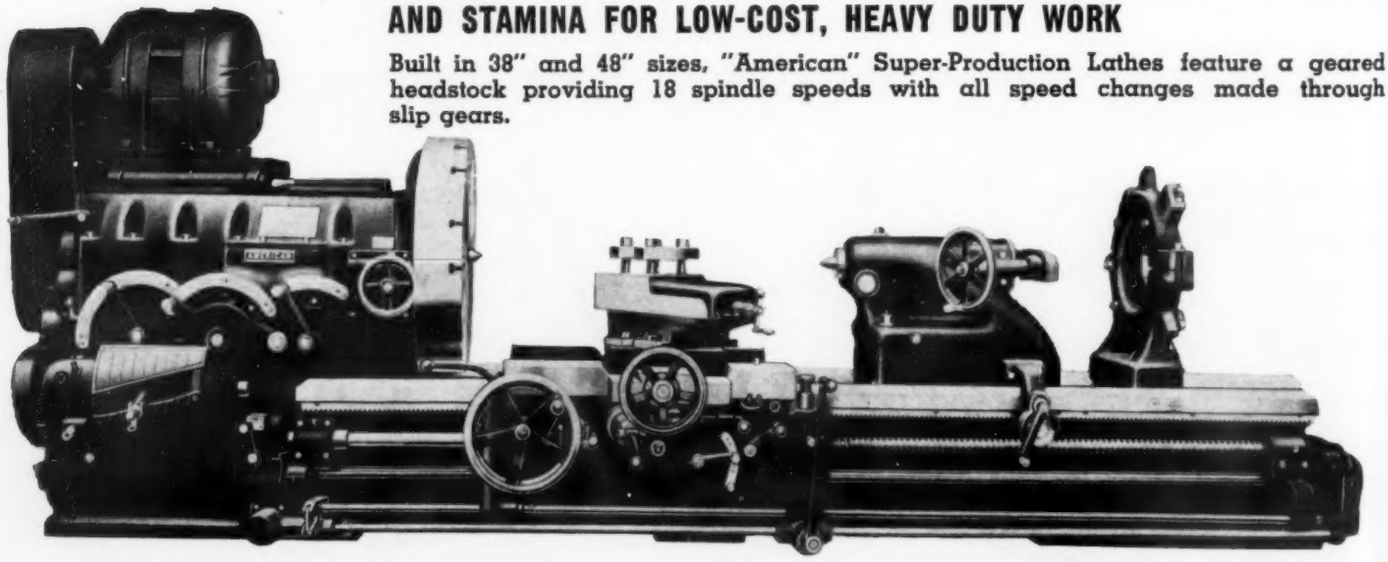
"AMER

"AMERICAN" PACEMAKER LATHES SET THE PACE FOR ACCURACY, SMOOTH CUTTING, SPEED AND CONVENIENCE . . . . . .

This new "AMERICAN"—built in 14", 16", 18", 20" and 22" sizes—represents high lathe value. Every detail has been worked out to meet all modern service requirements.

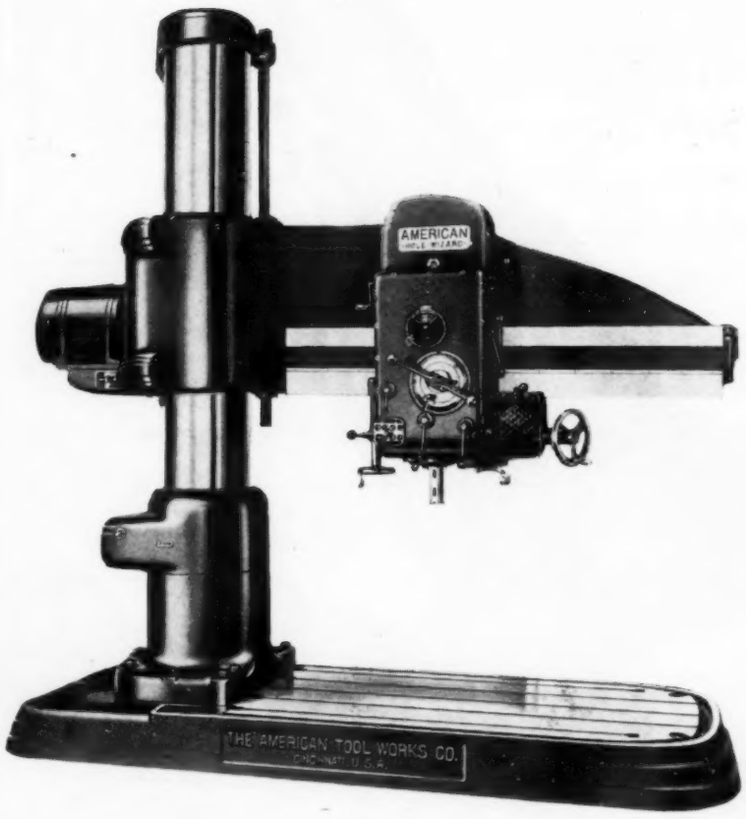
"AMERICAN" SUPER PRODUCTIVE LATHES PROVIDE THE POWER AND STAMINA FOR LOW-COST, HEAVY DUTY WORK

Built in 38" and 48" sizes, "American" Super-Production Lathes feature a geared headstock providing 18 spindle speeds with all speed changes made through slip gears.



The AMERICAN

ICAN" *for* HIGHER PRODUCTION AND SAVINGS *in* 1941



"AMERICAN" TRIPLE-PURPOSE RADIALS MAINTAIN PRECISION UNDER MAXIMUM DEMANDS IN DRILLING, BORING AND TAPPING

Built in column diameter of 19" with 6', 7' and 8' arm lengths. "American" Triple Purpose Radials offer unusual power and ruggedness for heavy duty service as well as easily controlled speed and feed ranges for a wide variety of work.

Take advantage of the many opportunities available on "AMERICANS" to modernize your operations and meet today's exacting demands for stepped-up production. Engineering bulletins are available giving complete, detailed information on every machine in the "AMERICAN" line. The many ultra-modern refinements and operative conveniences offered assure outstanding productive possibilities as well as substantial worthwhile savings.

LATHES
RADIALS
SHAPERS

TOOL WORKS COMPANY

CINCINNATI, OHIO

IF YOU WANT SPEED

CMC CLEARING Libby TURRET LATHES

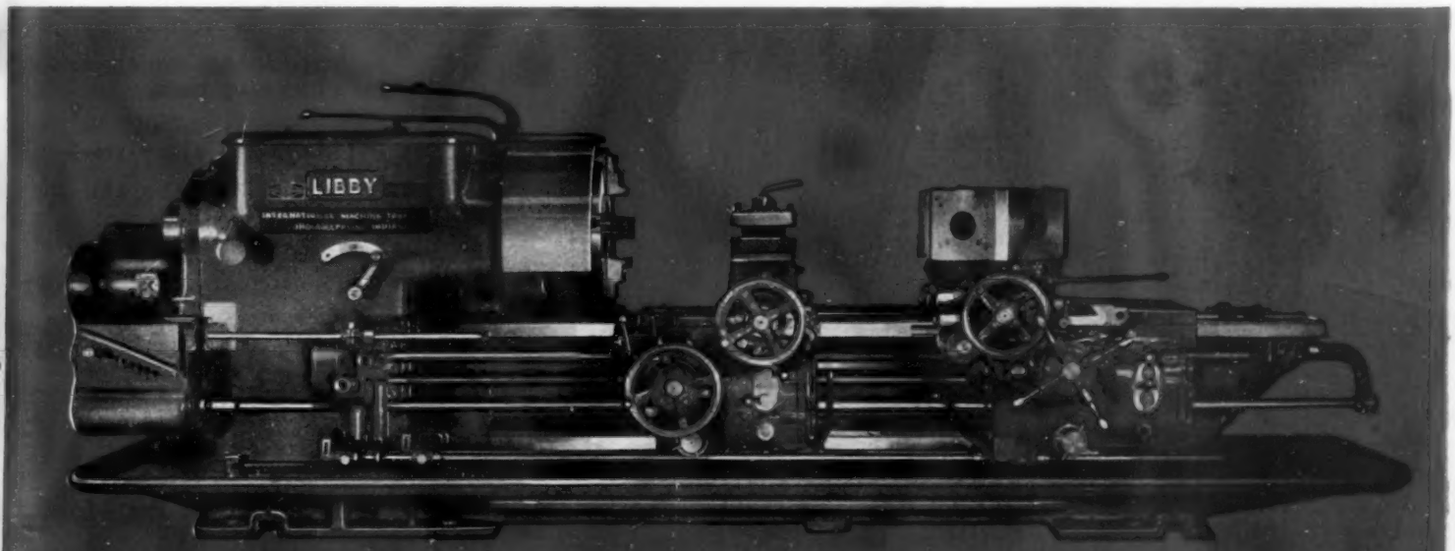
Libby TURRET LATHES

EARLY DELIVERIES

FOR DEFENSE PRODUCTION

—choose Libby!

Libby Lathes are built to stand-up for years, running beyond their rated speeds and power—and there's the secret for their success . . . That's the kind of Lathes you need for the unprecedented demands of National Defense. With a sturdiness for heavy cuts and a sensitiveness for the finest finish—with power in reserve—with versatility—with inherent quality throughout . . . That's why Libby Lathes are speedy lathes—ideally suited for manufacturing parts for heavy guns, for diesel engines, for aircraft, tanks, trucks, tractors, for all kinds of ordnance and munitions, for years of profitable, precision workmanship.



INTERNATIONAL MACHINE TOOL COMPANY, INC.

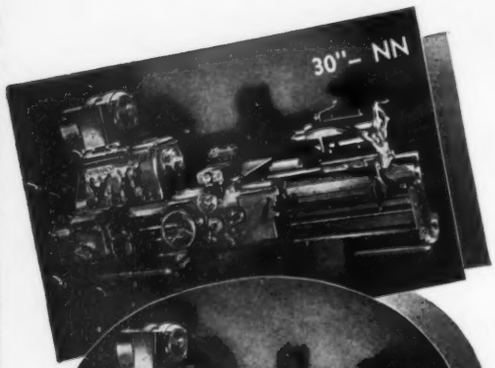
Indianapolis, Indiana

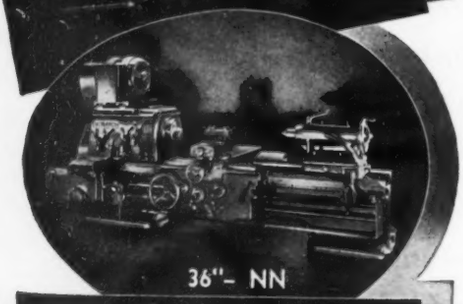
SUBSIDIARY OF CLEARING MACHINE CORP., CHICAGO

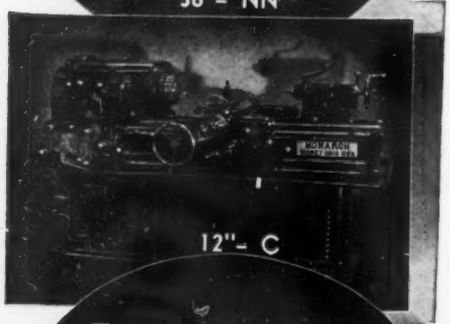
FOR NATIONAL DEFENSE

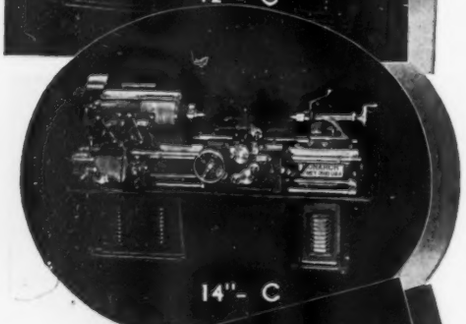
ON SOME SIZES

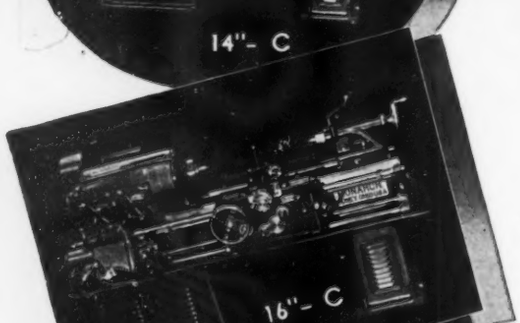
MONARCH LATHES

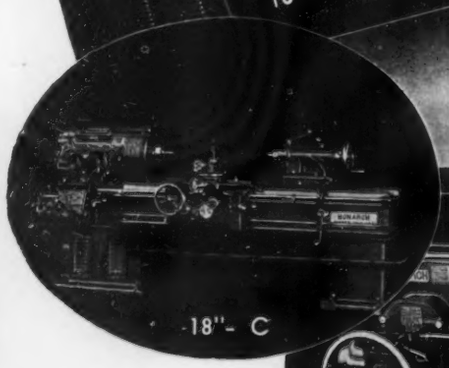








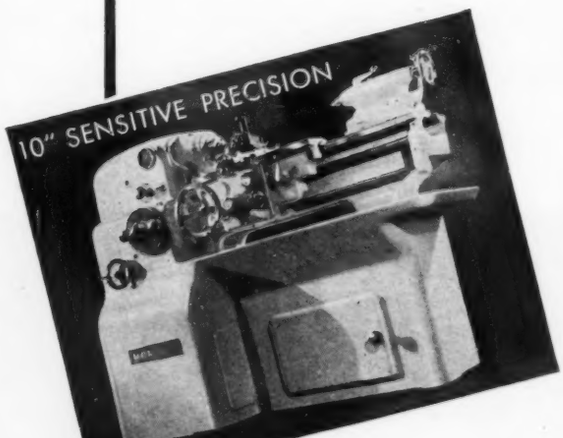




★ ★ ★ COVER THE TURNING FIELD

MORE AND MORE, one name comes quickly to mind when you think of lathes—the last word in lathes—MONARCH. It is the symbol of progress, of technical advancement, of forward thinking. If a job is to be turned, it is likely that one of the

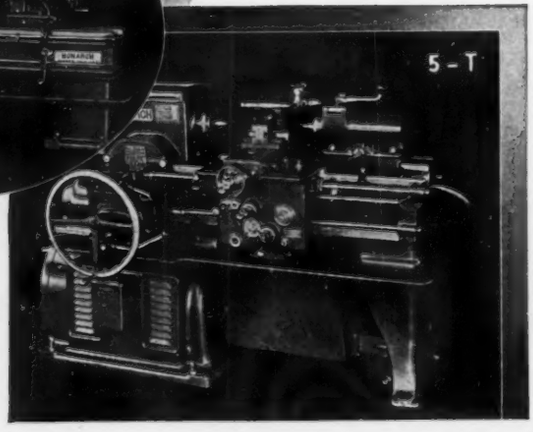
Some Modern Lathe Improvements that



1. Helical gearing for lathe headstocks.
2. Apron friction feed levers.
3. Adopting flanged spindle nose and discarding the threaded nose.
4. Automatic force feed lubrication.
5. Anti-friction bearing spindle mounting as regular equipment.
6. Anti-friction bearing mounting for all rotating parts.
7. Monarch is the all heat treated and hardened alloy-steel lathe.
8. Developing the anti-friction bearing taper attachment that has set new standards of accuracy and performance in taper turning.

MONARCH

"Expansion Time" Lathes By Monarch



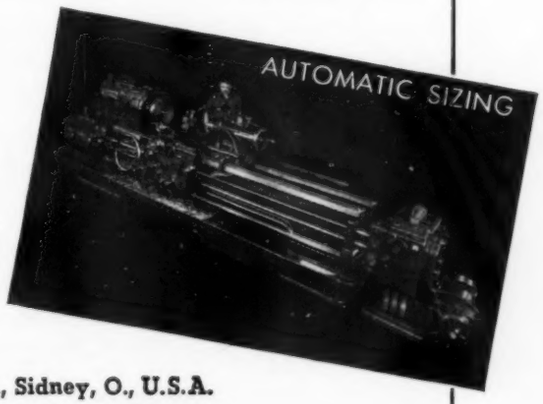
many sizes and types of Monarch lathes will do the job better, faster, and at lower cost per piece. Monarch engineers can bring to your turning problems a wealth of experience gained during 31 years of broadening the scope of lathe production.

are the Result of Monarch Pioneering

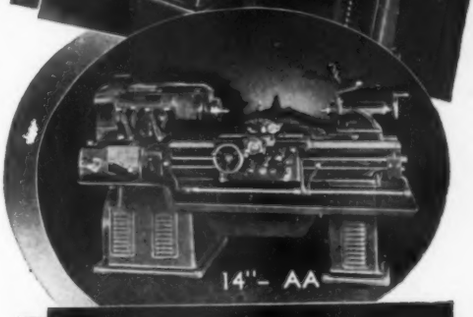
9. Developing and adopting FLAME HARDENING and grinding lathe bed way surfaces and other surfaces to eliminate wear and preserve accuracy.

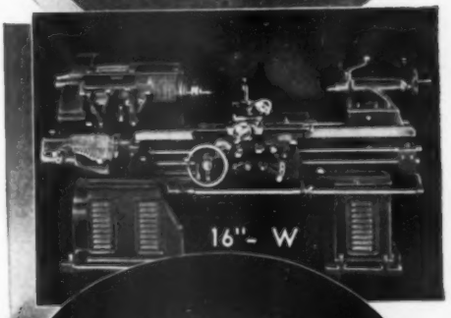
10. Developing AUTOMATIC SIZING for all sizes of Monarch lathes to improve quality and reduce lathe work cost.

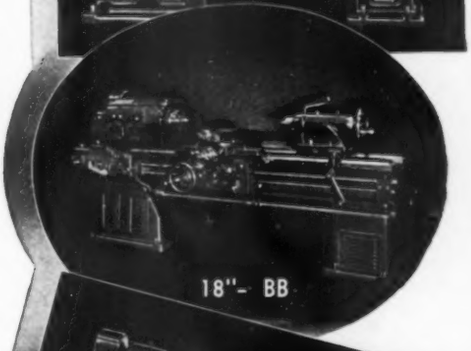
11. Developing a large number of lathe accessories and attachments to broaden the scope of lathe work, and better serve their users.

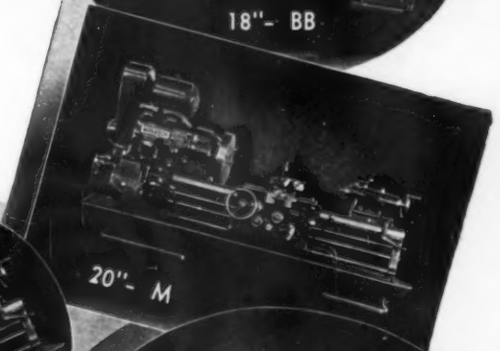


THE MONARCH MACHINE TOOL CO., Sidney, O., U.S.A.
Chicago Sales Office: 622 West Washington Boulevard,
Indianapolis Sales Office: 3115 North Meridian Street,
Newark Sales Office: 1060 Broad Street,
Pittsburgh Sales Office: 604 Chamber of Commerce Bldg.



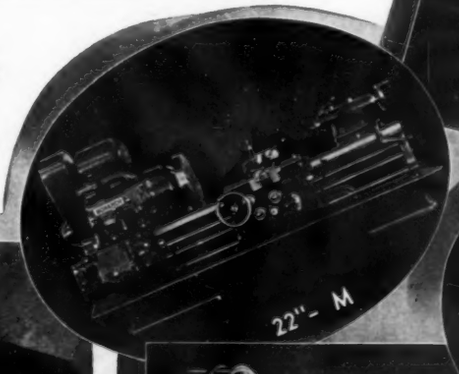


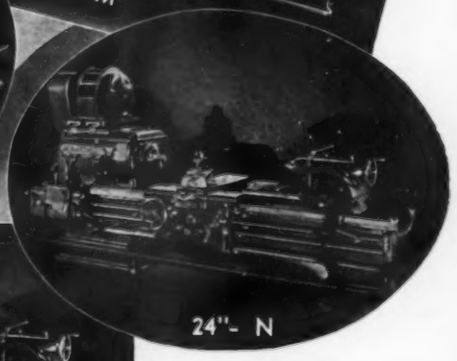


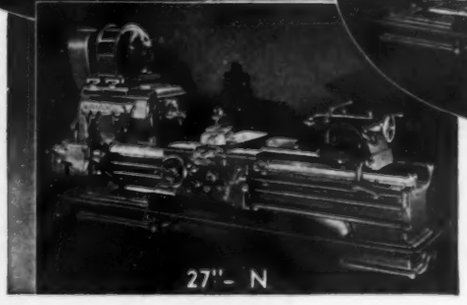


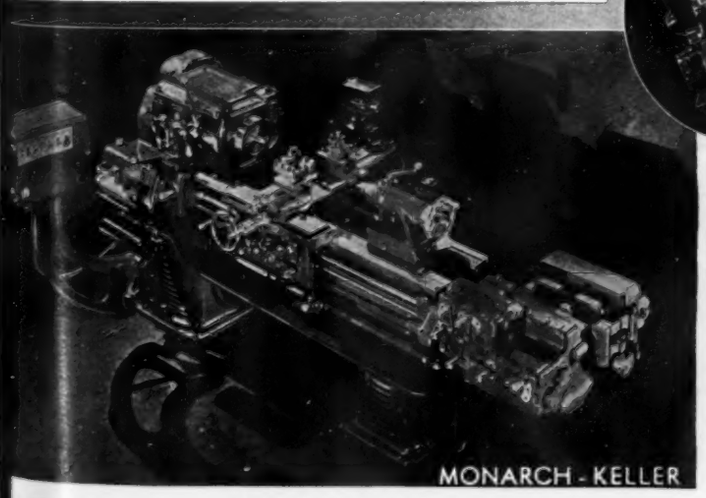
LATHES

Will Do Tomorrow's Competitive Job









Make Your Tools Contribute *Extra* PLANT CAPACITY

EVERY minute saved by preventing production interruptions is a minute added to the capacity of your equipment—and every minute saved in the tool room is a minute that can be devoted to making much needed new tools.

Better tooling is the way to save those extra minutes . . . *hours* . . . *DAYS.* Consider, for example, the time lost every time a tooling job must go back to scratch and start all over again—and the delays that occur in every shop when machines or presses must be stopped to repair or replace worn or broken tools.

Over a period, the total time lost in this way is staggering. Experience shows that the average tool is only *half* as good as it might be. That means that a substantial proportion of the time spent in the tool room is unproductive. And in the shop, each shutdown of equipment caused by tools may consume as much as several hours of time—time that would otherwise be available to increase output and reduce costs.

Currently, more than a thousand plants are successfully using Carpenter's Matched Set Method of Tool Steel Selection, and Carpenter's Matched Tool Steels as a part of a dynamic program that solves this problem by making it easy to improve tooling.

You can apply this program just as effectively. The literature at the left tells how. Chances are that you already have one or more of these helps. If you do—read them over again. Read them with a view toward their relationship to today's vital tooling needs. In them you will find a key to badly needed extra output and lower unit costs.

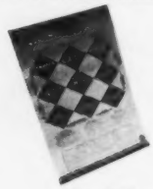
Or if you should not have copies—let us send them to you. All are free (except the textbook, "Tool Steel Simplified,") and will be sent you without obligation.

THE CARPENTER STEEL COMPANY
READING, PA.

Your

"BLUEPRINTS" FOR BETTER, FASTER TOOLING

Tool Steel Selector Wall Chart*



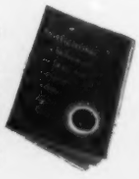
A convenient 4-color wall map that tells at a glance which tool steel to use.

Tool Steel Manual*

A vitally important manual on tool steel selection and heat treatment, based on the Wall Chart.

Spotlighting Hidden Plant Capacity*

A more complete discussion of the subject of this advertisement...with actual examples from practice. 14 minutes reading time.



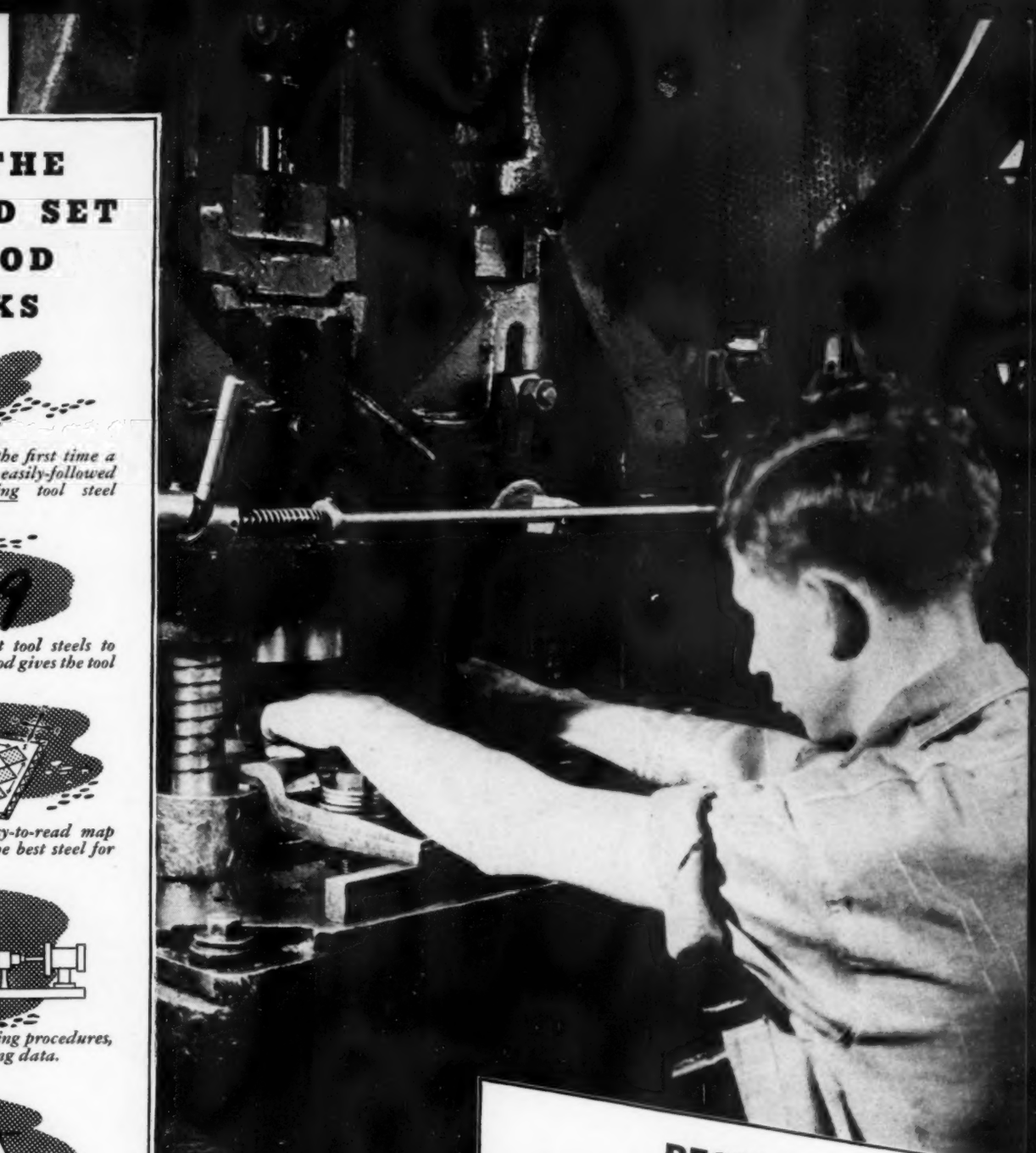
Tool Steel Simplified

(Price $1.00) A textbook on the proper selection and heat treatment of tool steel. Now in its 6th printing.

**Free to Tool Steel Users in the U.S.A.*

Carpenter

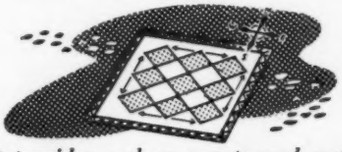
BRANCH WAREHOUSES AT—Chicago, Cleveland, Detroit
Hartford, St. Louis, Indianapolis, Philadelphia.



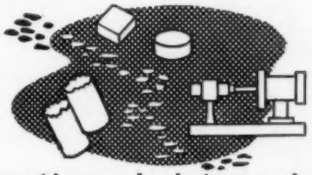
HOW THE MATCHED SET METHOD WORKS

It makes available for the first time a clear, easily-understood, easily-followed system for pre-analyzing tool steel requirements.

Instead of 921 different tool steels to choose among—this method gives the tool maker only 9.



It provides a clear, easy-to-read map that will guide you to the best steel for each tool.



It provides exact hardening procedures, and complete heat-treating data.

It promotes cooperation between departments by providing a common language of tool requirements.

RESULTS

Extra hours gained per month on typical machine tools through better tooling.

PRESSES	CUTTING TOOLS
64 hours	33 hours
14½ "	7½ "
42 "	54 "

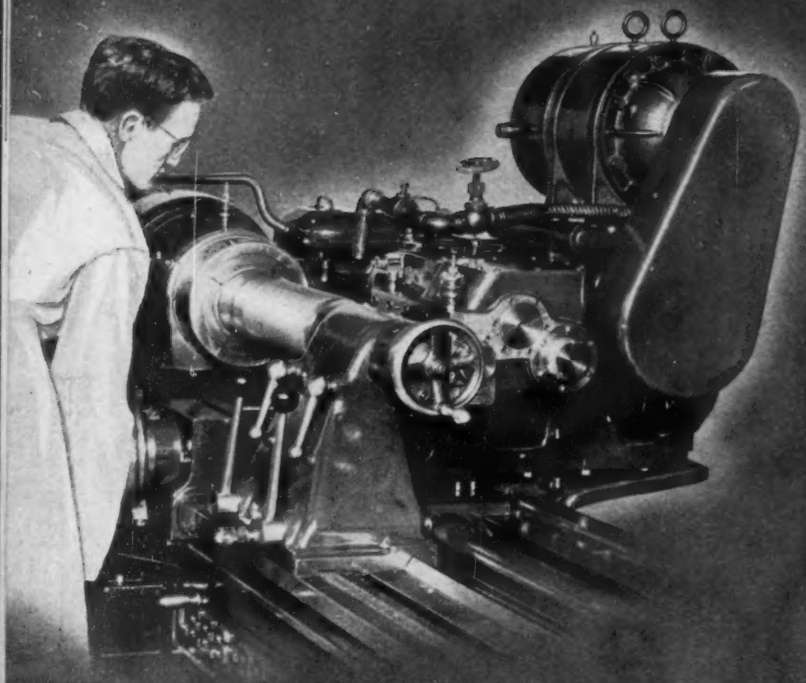
WHAT ELSE DO YOU GET?

- ✓ Lower manufacturing costs
- ✓ Lower tool-making costs
- ✓ Lower tool maintenance costs
- ✓ More output per hour
- ✓ More pieces per tool
- ✓ More tool room capacity

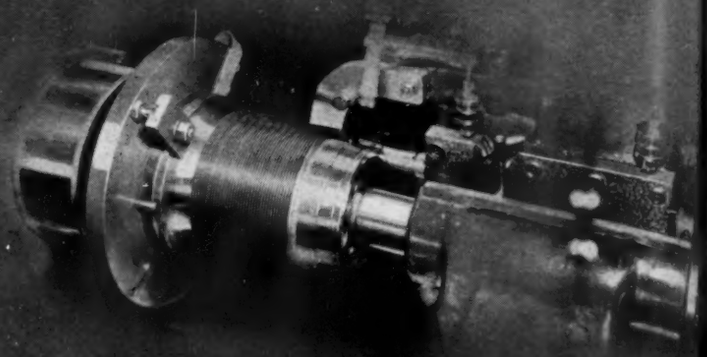
MATCHED TOOL STEELS

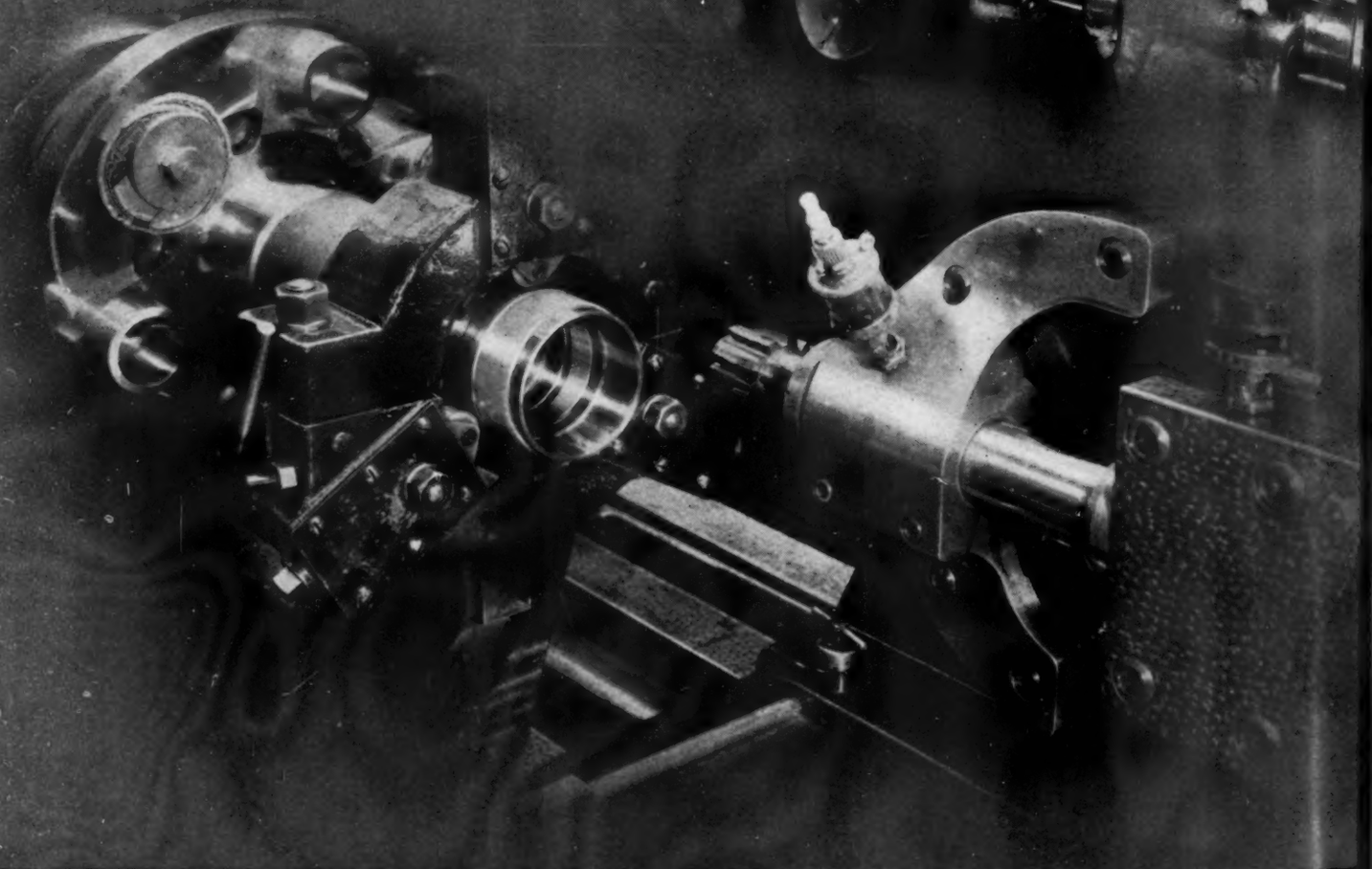
The Standard Tool Steels of Industry

SPEED THREAD PRODUCTION



ADD TO THE SUPERB QUALITY AND HIGH PRODUCTIVE CAPACITY OF LEES-BRADNER THREAD MILLERS THE FACT THAT THEY DO **NOT** REQUIRE HIGHLY SKILLED OPERATORS AND YOU HAVE THE PERFECT TOOL TO MEET TODAY'S URGENT REQUEST FOR SPEED—AND MORE SPEED.



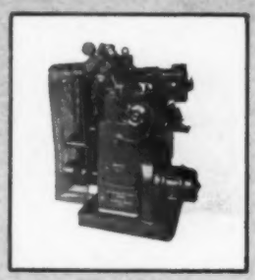


THE LEES-BRADNER CO.

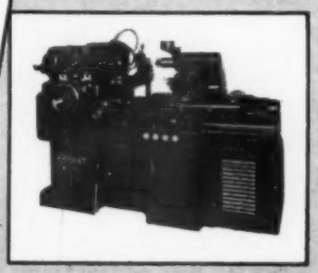
CLEVELAND

BRYANT

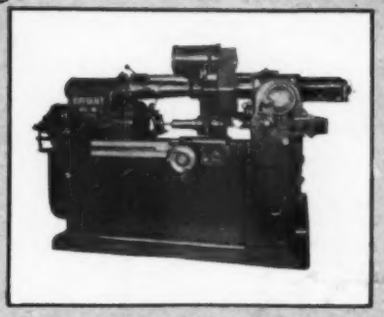
HOLE & FACE GRINDERS



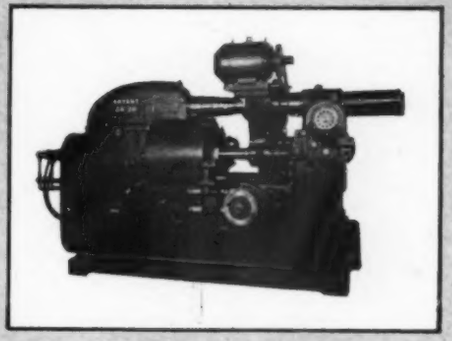
Series 5



Series 112



Series 16



Series 24

IF your production requires ground holes and faces, then there is a Bryant Grinder to meet your requirements. Bryant Grinders are built in a wide range of sizes to grind straight, taper, a combination of straight and taper, double taper, curved, cam shaped or blind holes. This range includes machines for tool room or production work. Bryant's experience in handling thousands of internal and face grinding jobs is at your service — this service is yours without obligation.

BRYANT CHUCKING GRINDER CO.
SPRINGFIELD, VERMONT, U. S. A.

CANADIAN GENERAL ELECTRIC KEEPS CLEVELAND MODEL A *Single Spindle* AUTOMATIC ALWAYS BUSY

● Industrial Canada buys production machines on the same basis as industry south of the border—*on performance*. Here is a 2½-inch Cleveland *Single Spindle* Automatic in the plant of Canadian General Electric, Davenport Works, at Toronto, kept busy producing locomotive stay bolt sleeves from 1 13/16-inch X1314 steel bar stock at the rate of 17 pieces per hour. Lots range from 2,000 to 3,000 pieces. Operations consist of feeding out, drilling, forming, threading and parting off the bar. A tapered thread, 12 to the inch, is required. Tolerances are plus-or-minus .002".

There are a lot of jobs in this plant that can be produced on this particular machine—and they are assigned to it as fast as they are discovered by comparing costs of different methods of production. Great flexibility has always been a part of typical Cleveland performance, due to its ease of tooling up and accessibility for adjustments. Operators like a Cleveland for these reasons especially.

For short production runs the Cleveland Model A is a surprisingly profitable investment for all plants that have them, and new economies in manufacturing costs are uncovered rapidly by their use. On current Model A machines a four-speed motor is standard equipment.

• • •

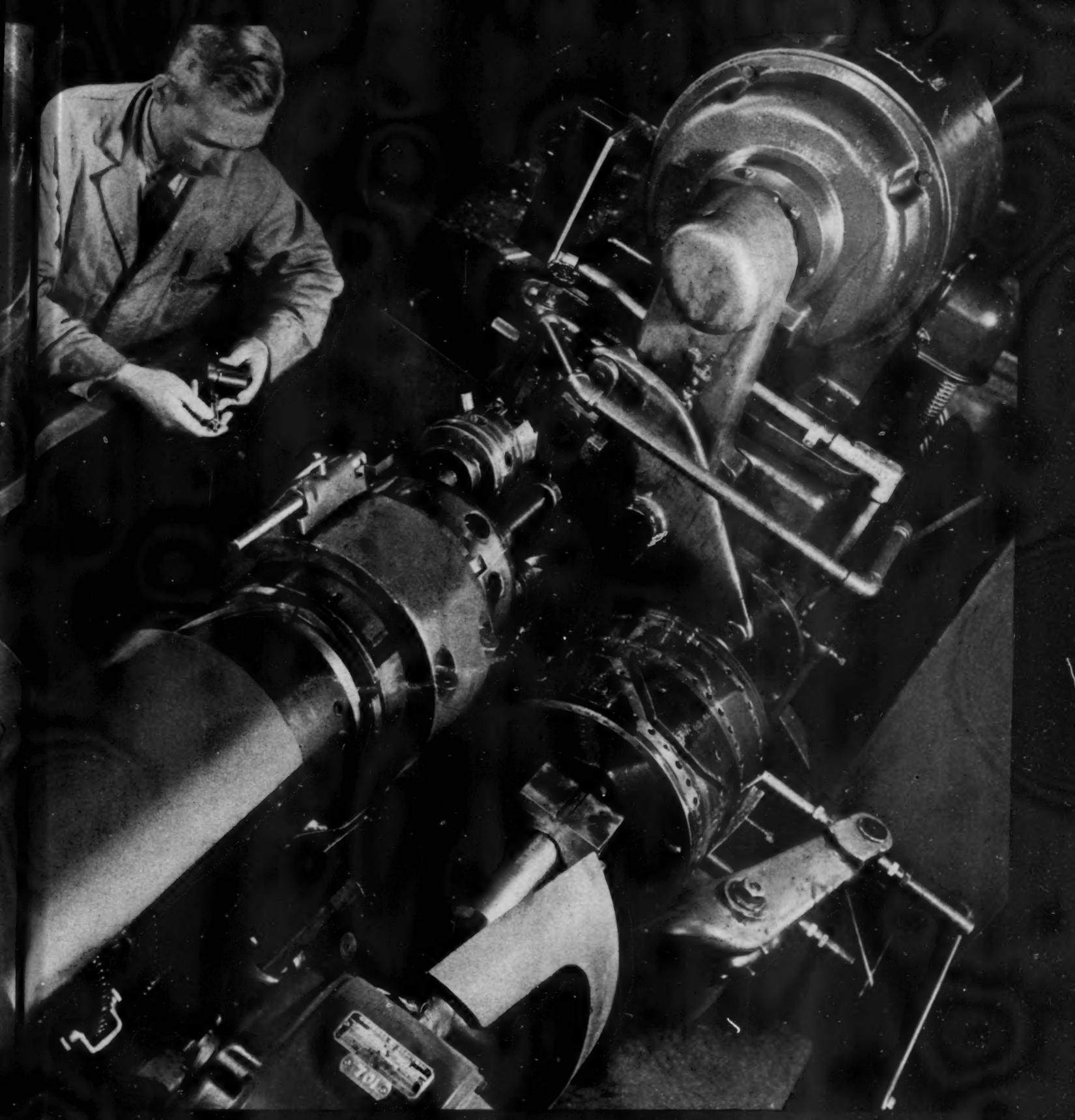
Model AA Cleveland Single Spindle Automatics are setting up new production records throughout the country. If you are not yet familiar with this amazing answer to modern production needs, ask for a copy of the brochure which describes its features.

THE CLEVELAND AUTOMATIC MACHINE COMPANY
2263 ASHLAND ROAD • CLEVELAND, OHIO

Sales Offices: NEW YORK—50 Church Street • DETROIT—2842 Grand Boulevard
CHICAGO—565 West Washington Street • CINCINNATI—314 American Building

Photographed through the courtesy of
CANADIAN
GENERAL ELECTRIC CO., LTD.
DAVENPORT WORKS • TORONTO, ONT.

CANADIAN
GENERAL ELECTRIC
COMPANY LIMITED



CLEVELAND

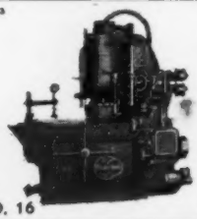
MODEL A *Single Spindle* AUTOMATIC

MODEL A—Built in 9/16-inch to 8-inch capacities inclusive

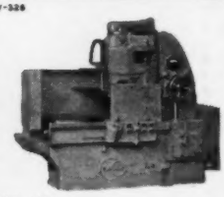
MODEL AA—Built in 1 1/16-inch and 1 3/8-inch capacities only

BLANCHARD

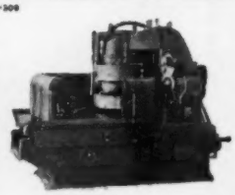
NO. 11



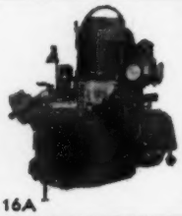
NO. 16



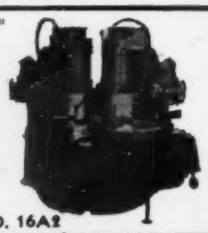
NO. 18



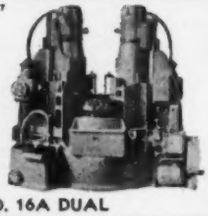
NO. 27



NO. 16A



NO. 16A2



NO. 16A DUAL

BLANCHARD WHEELS

Blanchard Surface Grinders are cutting costs and improving quality on both production and tool work

BLANCHARD

THEY are massive, powerful machines with ample weight of metal where it is needed for rigidity. Their controls are convenient and easy to operate. They generate a flat surface by the rotary motions of work and wheel — this makes wheel truing unnecessary and saves cost and time, especially when grinding from the rough.

Since Blanchard Grinders practically eliminate set-up time, the output per machine is high, even with an average operator.

A new development is the production of very fine finishes by Blanchard Grinding. If your work requires flat surfaces with a finish of a few microinches (by profilometer) the No. 11 or No. 18 Blanchard Surface Grinder with fine grit wheel, made by Blanchard, will produce them for you.

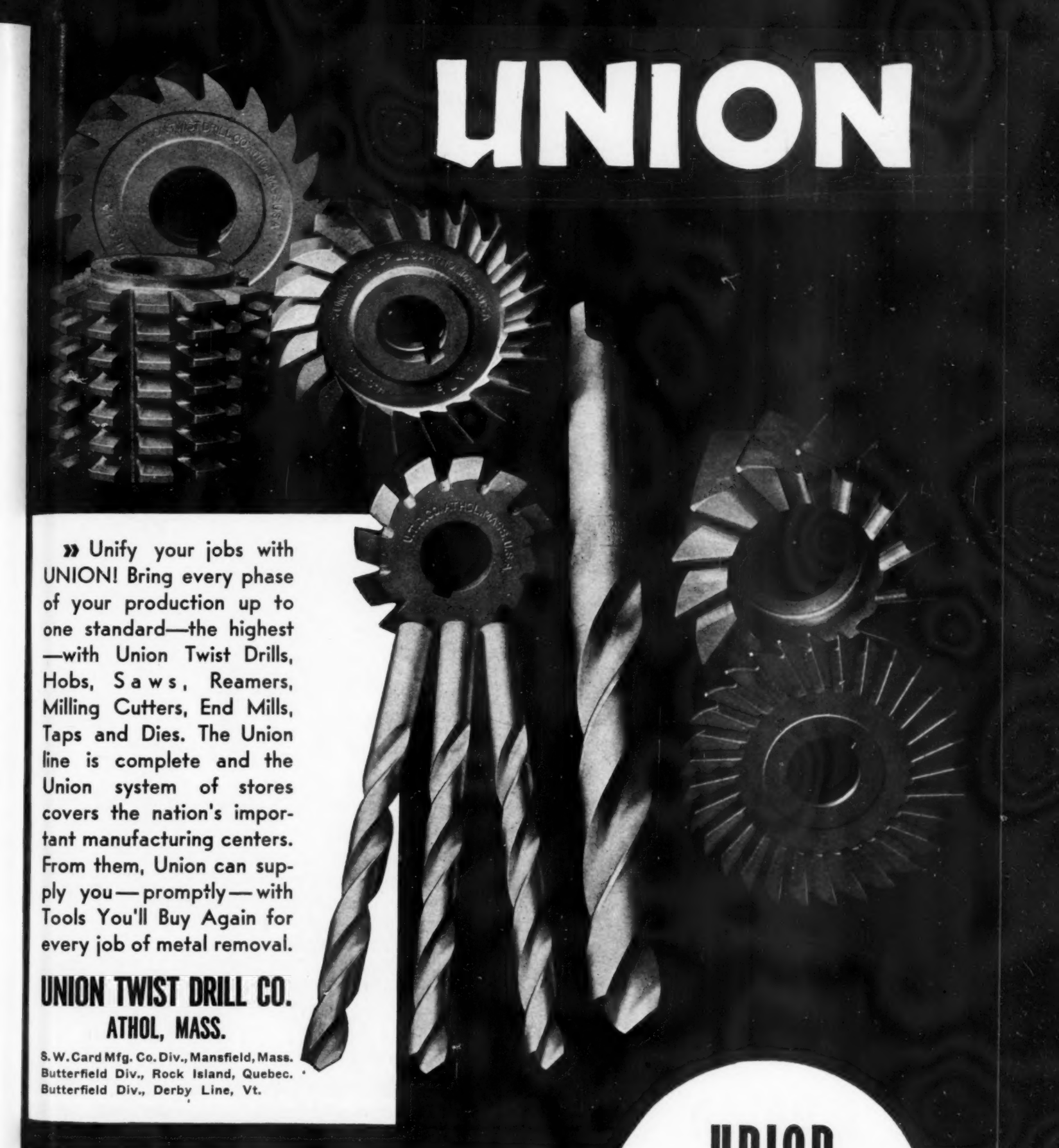
To keep Blanchard Grinders at maximum efficiency, it pays to use wheels manufactured by Blanchard.

A General Catalog covering the complete line of Blanchard products, or catalogs on any specific Blanchard product, will be sent on request.

BLANCHARD

THE BLANCHARD MACHINE COMPANY
64 STATE STREET, CAMBRIDGE, MASSACHUSETTS, U. S. A.

UNION



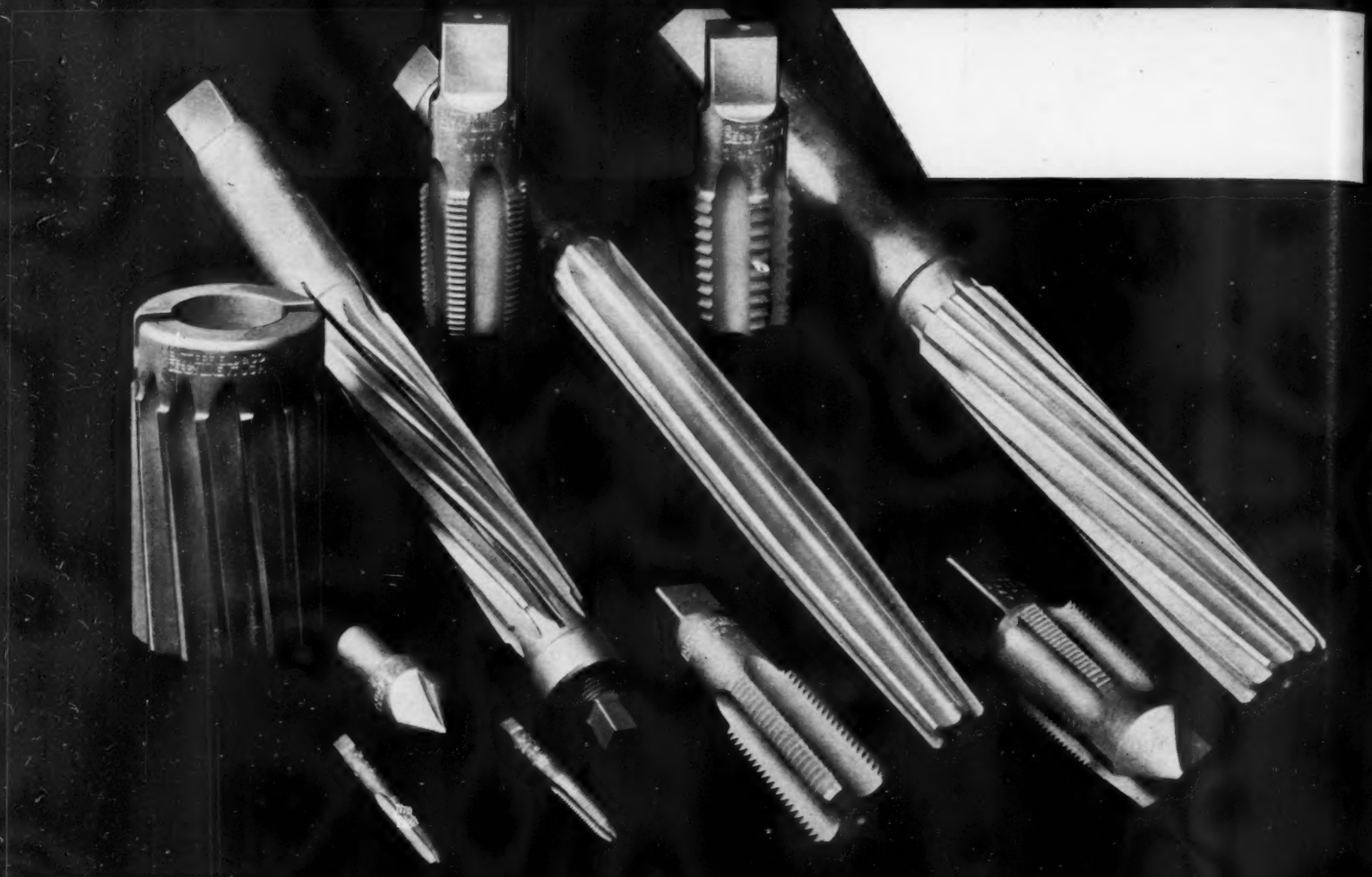
» Unify your jobs with UNION! Bring every phase of your production up to one standard—the highest—with Union Twist Drills, Hobs, Saws, Reamers, Milling Cutters, End Mills, Taps and Dies. The Union line is complete and the Union system of stores covers the nation's important manufacturing centers. From them, Union can supply you—promptly—with Tools You'll Buy Again for every job of metal removal.

UNION TWIST DRILL CO.
ATHOL, MASS.

S. W. Card Mfg. Co. Div., Mansfield, Mass.
Butterfield Div., Rock Island, Quebec.
Butterfield Div., Derby Line, Vt.

DIVISIONS of the UNION TWIST DRILL COMPANY

UNION
BUTTERFIELD
S. W. CARD



Butterfield

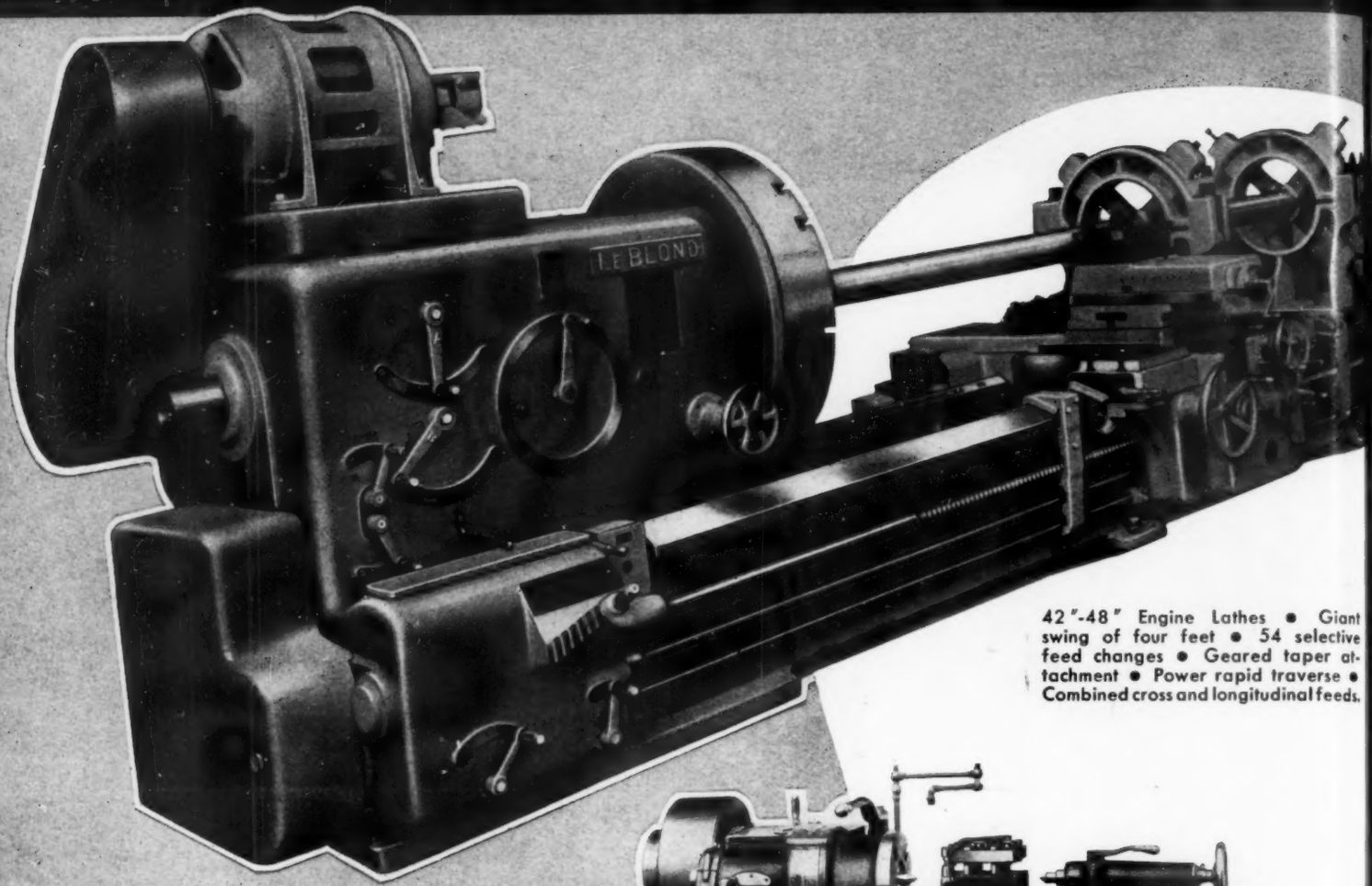
New machines, new materials, new production demands may cause your old tool specifications to become obsolete. Butterfield has the remedy . . modern taps and reamers for modern production. Write to Butterfield, giving the nature of your work, and we will respond with a stock tool of the correct material, properly heat-treated and ground for your particular work. In this way you'll get maximum production—top quality results and greater economies. Try it!

BUTTERFIELD DIVISION
DERBY LINE, VT. — ROCK ISLAND, QUE.

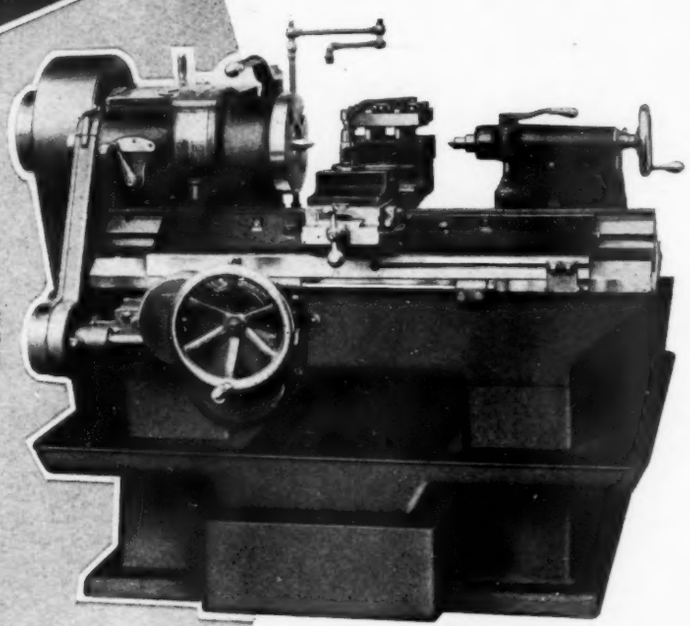
UNION
BUTTERFIELD
S. W. CARD

DIVISIONS of the UNION TWIST DRILL COMPANY

The CARD Quality
Threading specialists for sixty-six years! And each year we have increased our ability to give Card Tap users higher accuracy, more profitable production and greater economies on all types of threading jobs.
S. W. CARD MFG. CO.
Mansfield, Mass., U.S.A.
DIVISIONS of the UNION TWIST DRILL COMPANY
UNION
BUTTERFIELD
S. W. CARD



42"-48" Engine Lathes • Giant swing of four feet • 54 selective feed changes • Geared taper attachment • Power rapid traverse • Combined cross and longitudinal feeds.



6" and 9" Multi-cut Lathes • Automatic in operation • Quick easy set-up of tools for turning, facing, necking, and grooving cuts.

No. 2 Gun Rifling Machine • Rifles guns up to 3" bore, 88" in length • Automatic carriage control • Hydraulically powered.

LARGEST MANUFACTURERS OF

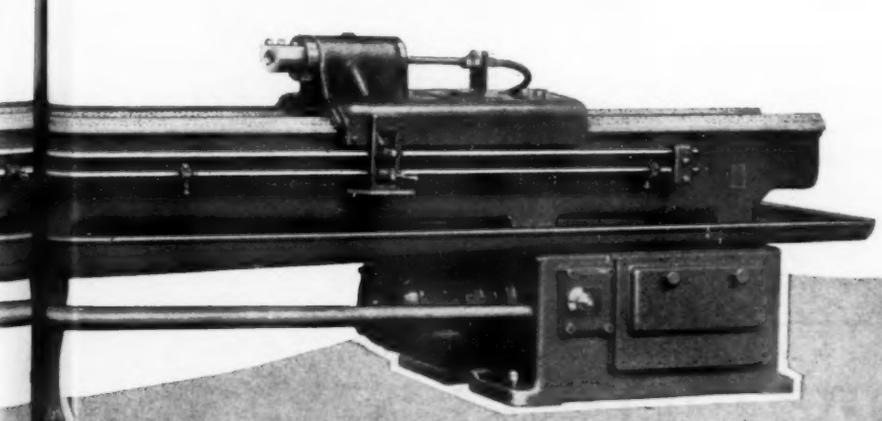
12″ and 16″ Automatic Lathes • Selective speed type headstock • Power rapid traverse • 3 speed changes controlled by single lever • Mechanically or hydraulically powered.

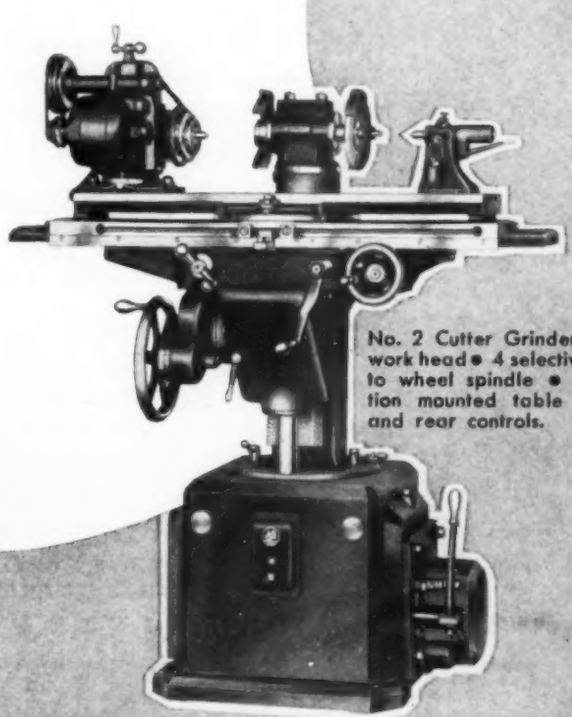
LEBLOND
CINCINNATI, OHIO
U.S.A.

Fast, Accurate Production

Every day the spindles on thousands of LeBlond machine tools are whirling at an accelerated pace in the interest of our national defense and domestic stability behind that defense. LeBlond machine tools—from the 13″ Super Regal to the Big Swing—are appreciated more and more, for they are all manufactured under the same high LeBlond standard of accuracy, speed, and work versatility.

The R. K. LeBlond Machine Tool Co.
Cincinnati, Ohio

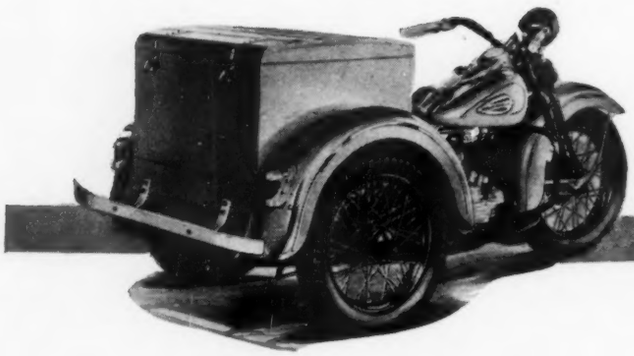




No. 2 Cutter Grinder • New work head • 4 selective speed to wheel spindle • Anti-friction mounted table • Front and rear controls.

A COMPLETE LINE OF LATHES

FASTER TOOL CRIB SERVICE WITH *Half* THE TOOLS . . . . *thru*



McCASKEY TOOL CONTROL

Speedier service at crib windows with a fifty percent reduction in tool inventory has resulted from the use of McCaskey Tool Control in the tool room of Harley-Davidson Motor Company, world-famous Milwaukee manufacturer of motor cycles, Package Trucks and Servi-Cars.

PRODUCTION engineers Gordon M. Davidson and William S. Hansen, highspot the outstanding advantages and savings shown by analysis of the first year of McCaskey Control:

"We know definitely what tools are required for operation of the department. As a result, the crib inventory has been cut 50%, even though some items have been added when the need has been indicated.

"The Crib is much better organized. There now is a place for every tool and no time is wasted hunting tools either in the crib or on the production floor. Tools are systematically inspected when returned and immediately reconditioned, if necessary.

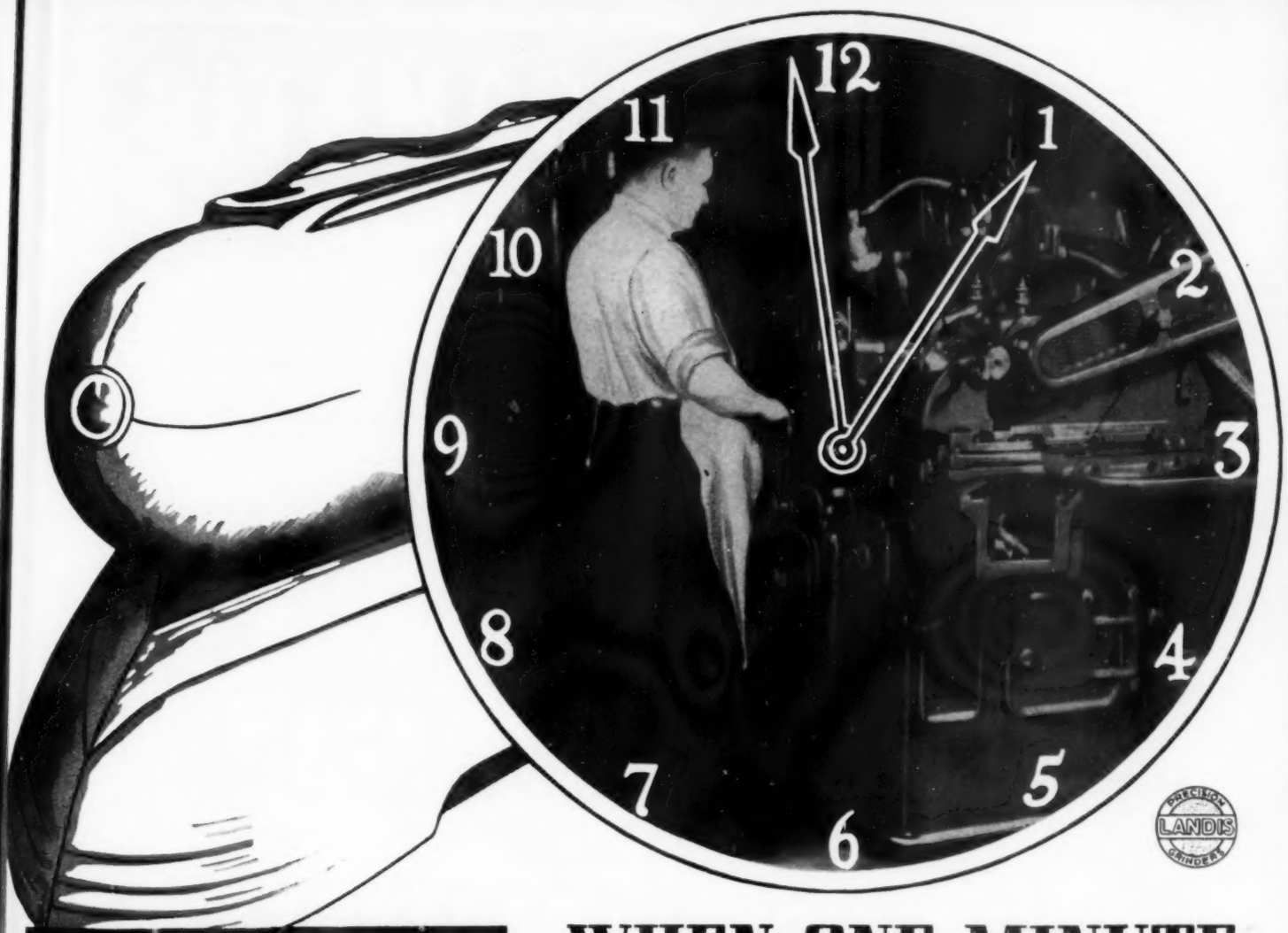
"The withdrawal and return of tools is much faster than with brass checks. Our employees would object to returning to the check system. The many results of McCaskey Control actually have exceeded our greatest expectations."

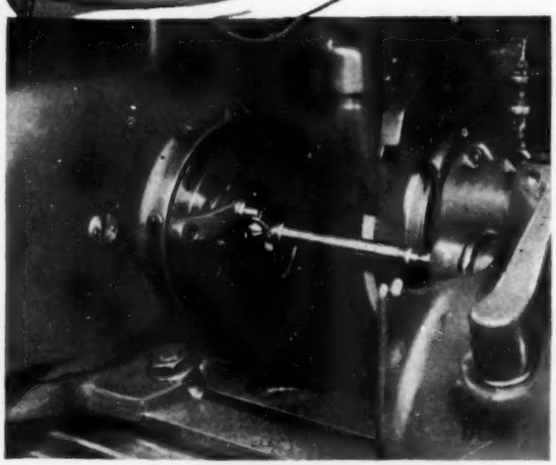
Prevent your cribs from becoming production bottlenecks. You *know* what tools you need with McCaskey, no more no less; you *know* where every tool is, can locate them in a few seconds; no lost time for machines and men; no loss or theft and less breakage; easily installed in the busiest crib; surprisingly inexpensive. Speed-up your production by modernizing your tool service. Write today for facts.

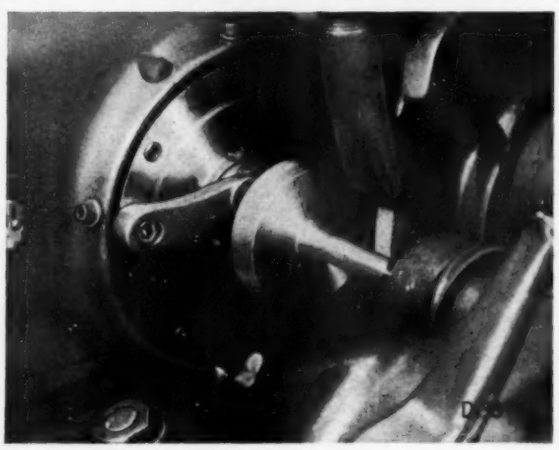
McCASKEY REGISTER COMPANY, ALLIANCE, OHIO

McCASKEY INDUSTRIAL CONTROLS

PRODUCTION • INVENTORY • MAINTENANCE • TOOLS • COSTS • PAYROLL







WHEN ONE MINUTE
Must Mean 60 Seconds

THERE are few organizations in which one minute is as important as at the Hamilton Watch Company of Lancaster, Penna.

To produce their widely known precision product requires the utmost precision in manufacture. Consequently their equipment is carefully chosen. It includes a Landis 10" x 24" Type C Hydraulic Universal Grinder, which is used for such tool room work as the lathe spindles and lathe step chuck illustrated. A limit of .0003" is generally maintained, although some work is held still closer.

You too can expect from Landis Grinders that split thousandths accuracy which assures split second performance.

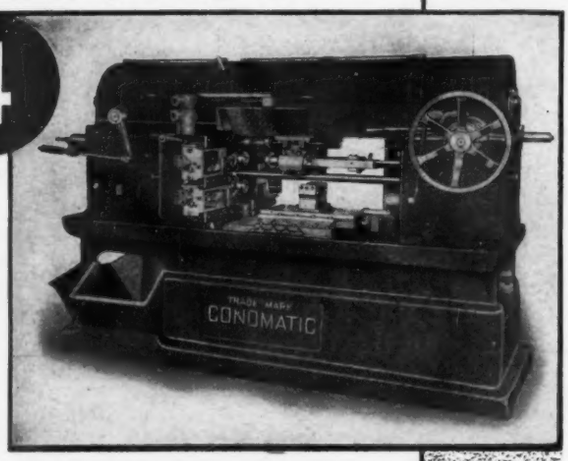
360

LANDIS
WAYNESBORO *Tool Company* PENNSYLVANIA

CONOMATIC
SCREW MACHINES

ECONOMY

4

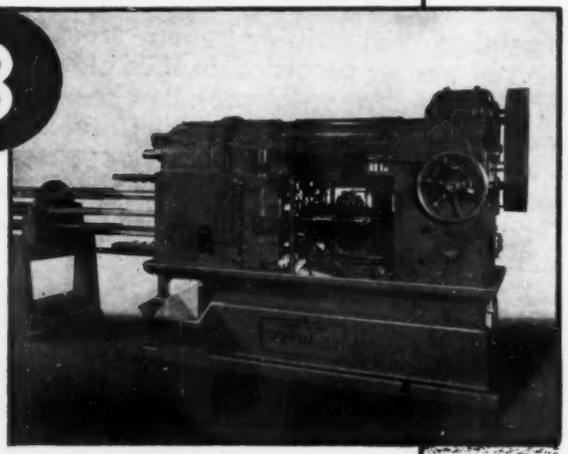


ACCURACY

6

PRODUCTION

8



PROFITS

CONOMATICS are built with 4, 6 and 8 spindles to cover the complete demands of those manufacturers who want to streamline their production to the point where profits are assured.

Parts may be produced from bars up to 6 inches in diameter with a milling length of 7 inches. The Cone policy of exceptionally rigid construction permits taking unusually heavy forming cuts at maximum speeds and feeds. This, together with rigid slides, accessible tooling, cams out of the way, individual forming slides, and individual positive forming stops, are but a few of many profitable CONOMATIC features. Your inquiries on machines and time studies will incur no obligation.

SEND FOR YOUR FREE COPIES OF THE NEW CONOMATIC CATALOGUES

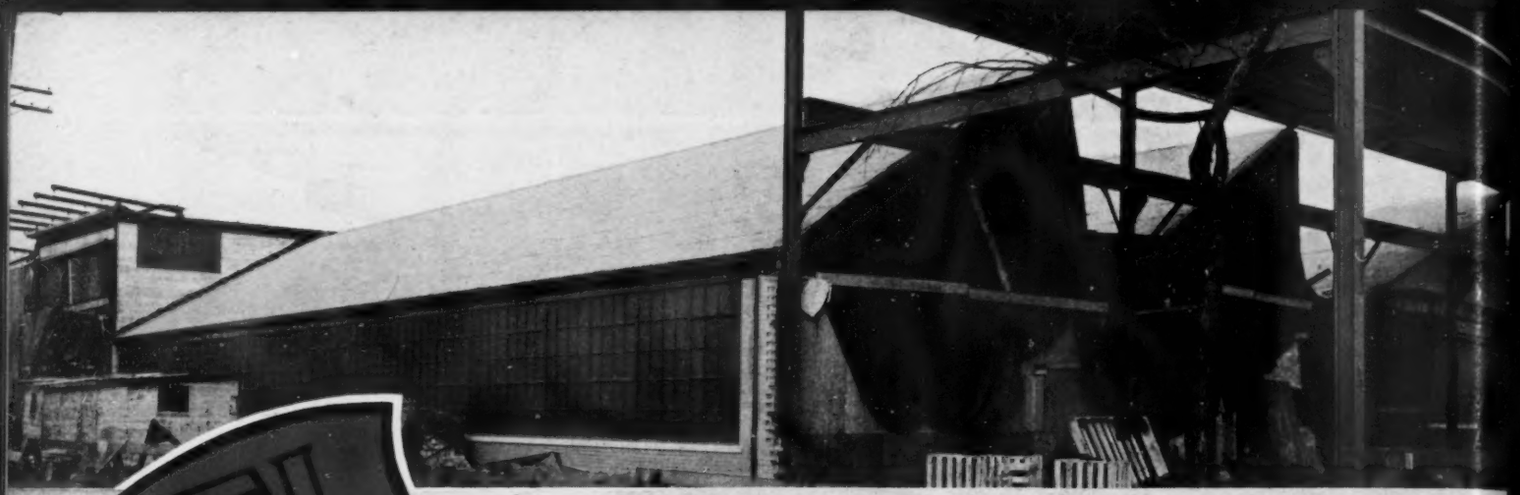
CONE AUTOMATIC MACHINE COMPANY, INC.
WINDSOR, VERMONT

WORKING CONSTANTLY

with

EXPANDED FACILITIES HELPING INDUSTRY TO BE BETTER TOOLED FOR NORMAL *plus* DEFENSE PRODUCTION

☆



★ New section of the G&L plant now under construction. This unit was specially planned to tie in with the now full-capacity-operating G&L plant so that present operations can be extended. Also, it allows for G&L to have needed room for the schooling of apprentices without interference to the flow of work.

The G&L organization, as customary, is doing all in its power to give industry full cooperation. However, demand for the G&L has over-taxed our facilities so that early deliveries on any one of our many types of horizontal boring, drilling, and milling machines must be deferred.

Because of this situation, it is advisable to order your G&L equipment at the earliest moment, thereby minimizing your waiting time and making it possible for you to that much sooner modernize with the G&L method — also that you can enjoy greater accuracy and speed with less tool spoilage — so that you can minimize work spoilage — and so that your operators will not suffer excessive fatigue.

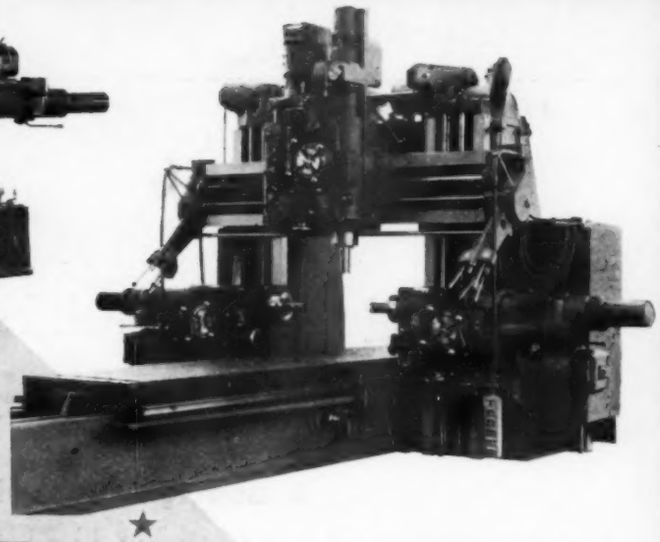
Play safe when placing orders for future delivery. Design changes in your product are apt to make single-purpose machinery unsuitable for your needs if delivered months later. When you order a G&L you get a machine designed not only to give you the most in speed and range of work but because of its versatility and flexibility, one that will be of greatest value to you on the date it is placed in your service. Buy Giddings & Lewis Many-Purpose machines.

☆ ☆ ☆

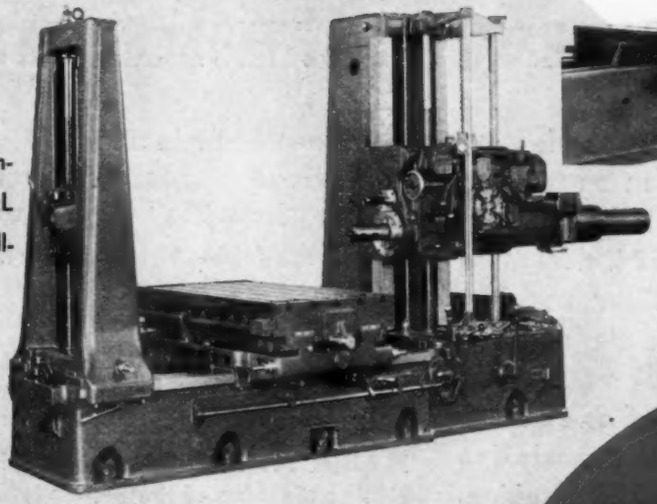
THE MORE G & L USERS -----

Gives You
FLEXIBILITY AND SPEED FOR TODAY — PRODUCTION SECURITY FOR THE FUTURE

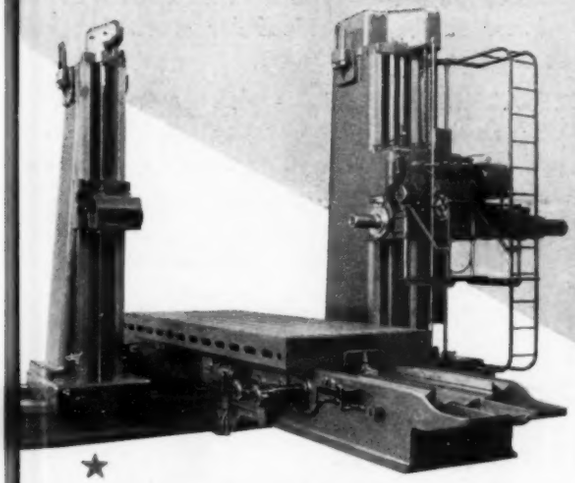
★ 340-RT: (4" main spindle), G&L Horizontal Boring, Drilling and Milling Machine with built-in 48" diameter power revolving table



★ 340-PQ3H: 3 head-planer type G&L Horizontal Boring, Drilling and Milling Machine

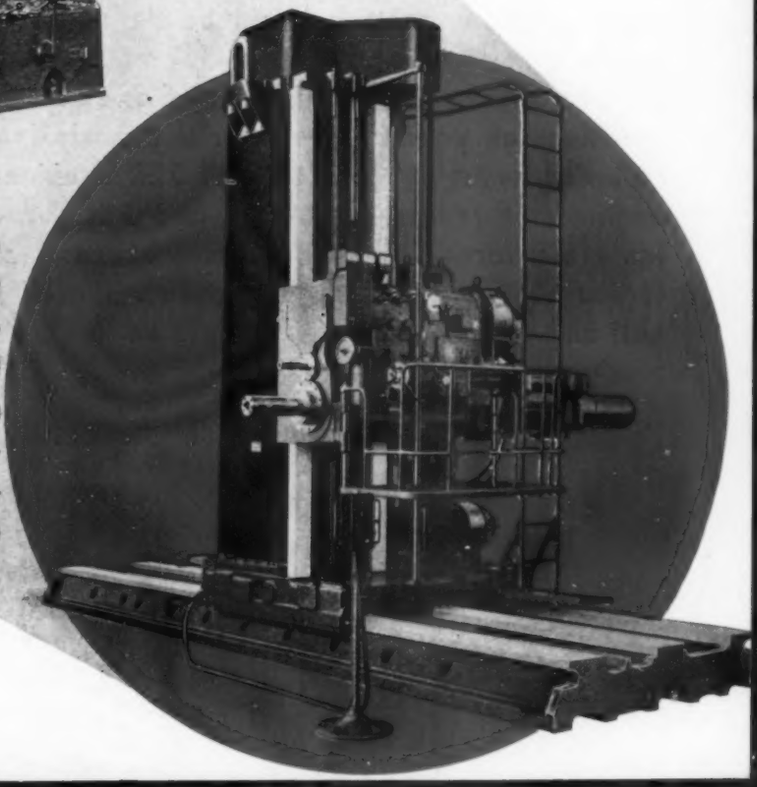


★ 340-T: (4" main spindle) Table Type G&L Horizontal Boring, Drilling and Milling Machine

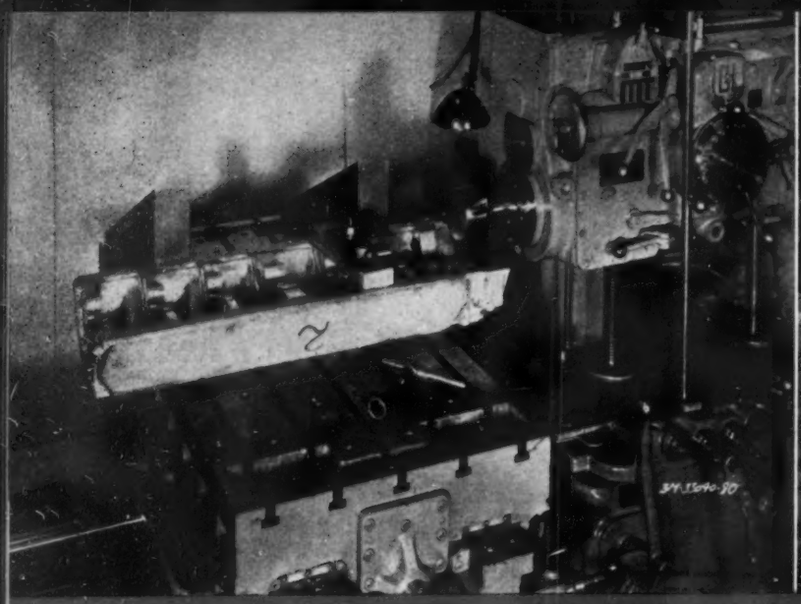


★ 360-P: (6" main spindle) Planer Type, G&L Horizontal Boring, Drilling and Milling Machine

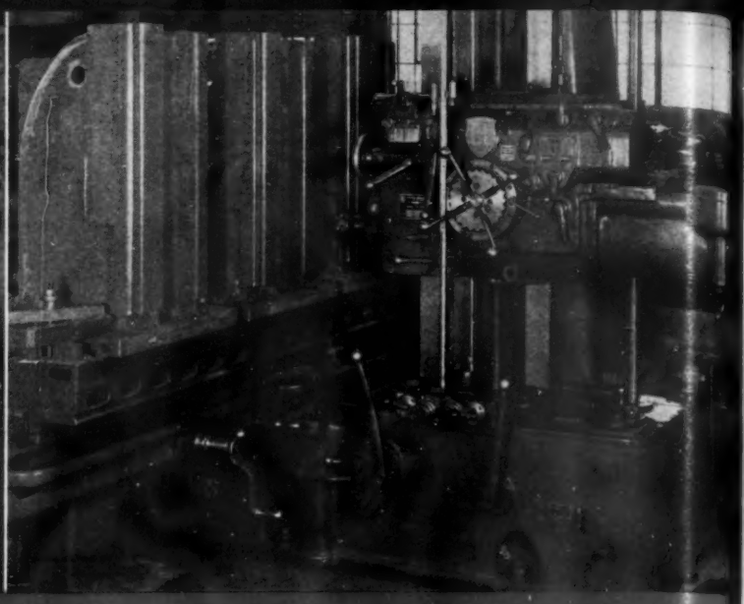
★ 560-F: (6" main spindle) new 50 series Floor Type G&L Horizontal Boring, Drilling and Milling Machine with portable remote control station



THE MORE G & L BOOSTERS



Rough bore reduction gear bearing in lower crankcase of an aircraft engine



Milling ways on multiple set-up of three column castings

THERE IS A PROPER TYPE G&L FOR YOUR ACCURACY, SPEED, AND LOW COST NEEDS

The G&L Method is showing remarkable savings wherever it has been put in operation. Get full particulars on any of the G&L Machines or adaptations of new G&L design to accommodate your own particular requirements. Send us prints of your castings or tell us the kind of work you have and we shall be glad to outline the possibilities of one of our machines on your type of work. Descriptive bulletins, covering every type of G&L machine, engineering recommendations, and G&L service are offered to manufacturing executives. If you wish, a G&L representative will gladly call and give you all of the facts on the G&L Method.

Get the G&L *Facts* TO GET A COMPLETE AND IMPORTANT MODERNIZATION STORY . .

Machines built in Table, Floor, Planer, and Multiple Head Types with main spindle diameters ranging from 2½" to 8" inclusive.

TABLE TYPE MACHINE: either standard design or with special adaptations of machine with extra long cross travel when carrying heavy castings.

MULTIPLE HEAD MACHINE: these machines can be furnished with two, three, and four vertical and horizontal heads.

PLANER TYPE MACHINE: Horizontal Boring, Drilling, and Milling Machine of the planer type with adjustable column. With large planer table, it is ideal for machining large Diesal engine frames.

FLOOR TYPE MACHINE: obtainable with conventional type head or with bore spindle sliding in an adjustable quill. The adjustable quill is a big advantage on floor type machines for setting large milling cutters.

GIDDINGS & LEWIS MACHINE TOOL CO.

FOND DU LAC, WISCONSIN

HORIZONTAL
★ BORING
★ DRILLING
★ MILLING
MACHINES

THE MORE G&L USERS . . . . THE MORE G&L BOOSTERS

MILLIONS
of machine finished
Bronze Bearings

HUNDREDS OF *Different* SIZES

Immediately from STOCK

The next time you need bronze bearings or bushings . . . *specify* JOHNSON GENERAL PURPOSE. Select the exact dimensions you want from our stock list of over 800 individual sizes. And then check us for rapid delivery. Your order will be shipped the same day it is received.

Vast stores of each individual size are maintained in every principal industrial city. These stocks are supported by eighteen strategically located warehouses.

Johnson General Purpose Bearings are cast in S.A.E. 64. This assures you the maximum in performance and bearing life. Every bearing is machine finished, ready for assembly. Oil grooves, slots or holes can quickly, easily be added. Why not try this remarkable service on your next order?

Write for **FREE** *Catalogue*

JOHNSON BRONZE COMPANY

Sleeve **BEARING HEADQUARTERS**

515 SOUTH MILL STREET • NEW CASTLE, PA.

Accuracy ·

24 HOURS A DAY

Photograph by Gerlach

"Pratt & Whitney, produce!" says Uncle Sam. Once again Pratt & Whitney is in high gear and at full throttle supplying defense industries with huge quantities of the world's finest basic machine tools, cutting tools and gages. So all night long, through the acres of glass that enclose P&W's busy shops and vast assembly bays, you may see the greenish lights glittering brightly. And close by, pile drivers slam . . . riveting hammers echo hollowly; construction is well under way on two plant additions for future increased production.

Pratt & Whitney knows production for defense needs from long experience, beginning with our own Civil War. That experience has proved that there is one mitigating grace in wars and depressions: they have a way of forcing improvements and new discoveries that ultimately bring important benefits in price and quality to consumers of peacetime goods.

This is a Pratt & Whitney pledge: to produce to our utmost those of our products needed for our country's defense . . . and at the same time to continue to devote every available hour to peacetime industrial development. We desire above all things the constant advance of the American Way—and we work at it 24 hours a day.

Photograph by Kessel

Photograph by Kessel

PRATT & WHITNEY WEST HARTFORD CONNECTICUT

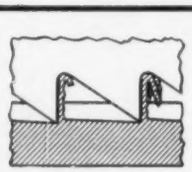
DIVISION NILES-BEMENT-POND COMPANY

The ATKINS CURLED CHIP *Tells This Story...*

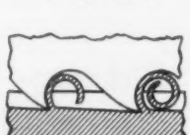
HOW 1940's MOST AMAZING DEVELOPMENT IN METAL CUTTING IS SPEEDING THE NATIONAL DEFENSE PROGRAM FOR '41

★ Faster metal cutting, as made possible by the Atkins Curled Chip System will step up operating rates and open production bottle necks in 1941. For the essence of Curled Chip Saws is SPEED—getting more metal cut in less time . . . Speed made possible by a new tooth-and-gullet design that removes metal in quickly released coiled shavings instead of broken filings . . . Speed that permits the operation of modern production cutting machines at maximum rates.

Write us—or ask your jobber—for full information on the sensational Atkins Metal Cutting System—symbolized by the "Curled Chip" and including all types of saws for cutting metal—Circular Milling Saws, Segmental Cold Saws and Powersaw Blades.



Old Type Tooth



Atkins Curled Chip Tooth

Here's Key to Sensational Cutting Rates of Curled Chip Saws

Conventional tooth removes metal by a "pushing" action—telescopes chips into the gullet in fine pieces—wastes power.

Observe efficient cutting action of Atkins Curled Chip tooth. Chips roll up in the gullet—"explode" like released clocksprings from the end of the cut. No choking of gullet—Instead, a fast crisp cutting action permitting higher speeds, heavier rates of feed and longer tool life.

E. C. ATKINS AND COMPANY
424 S. Illinois Street Indianapolis, Indiana

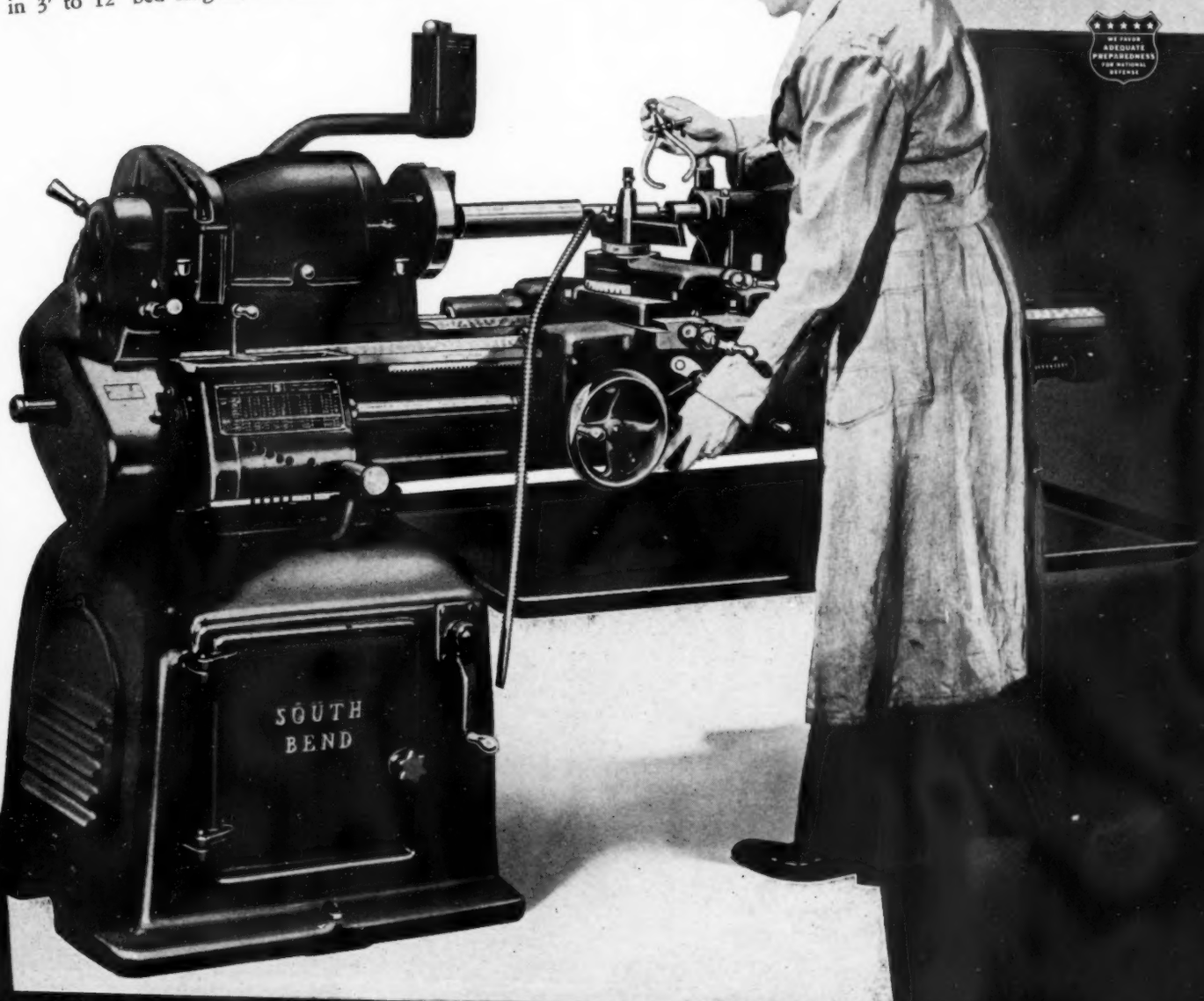
ATKINS *Curled Chip System of Metal Cutting*

THE *Precision* REQUIRED FOR MODERN INDUSTRY

South Bend Lathes are designed and built to provide the extreme precision required in modern industry. They are giving tool room accuracy on close-tolerance production work in hundreds of manufacturing plants throughout the United States. The smooth, vibration-free belt drive to the spindle permits finish turning or boring with such precision that subsequent grinding, honing or lapping operations can often be eliminated.

South Bend Lathes are made in 9", 10", 13", 14½" and 16" swing, in 3' to 12' bed lengths, in Motor Drive and Countershaft Drive.

SOUTH BEND LATHES

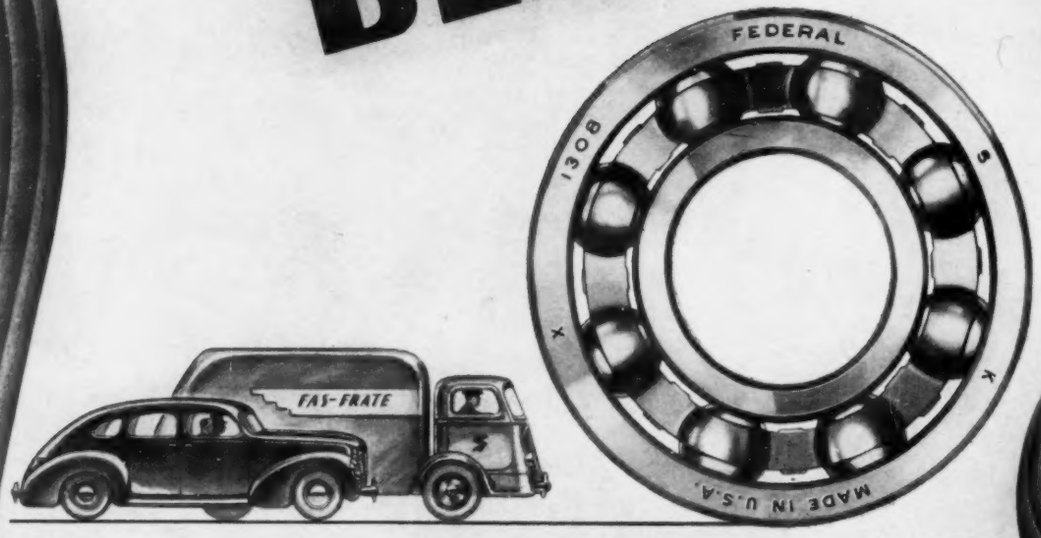


SOUTH BEND LATHE WORKS

LATHE BUILDERS SINCE 1906

287 E. Madison St., South Bend, Ind., U.S.A.

FEDERAL BEARINGS



TRADE MARK

THE FEDERAL BEARINGS CO., INC.

Makers of Fine Ball Bearings

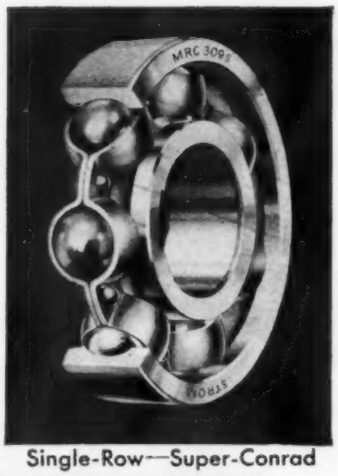
POUGHKEEPSIE, N. Y.

Detroit Sales Office: 2608 Book Tower • Chicago Sales Office: 902 S. Wabash Ave.
Cleveland Sales Office: 402 Swetland Building

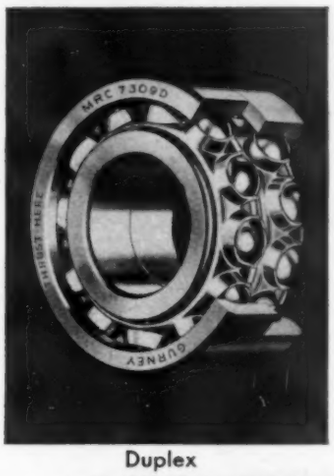
M-R-C Ball Bearings

offer a Complete Range of Types and Sizes for Machine Tool Requirements—backed by More than 40 years of Experience.

le-Row—Maximum-Capacity

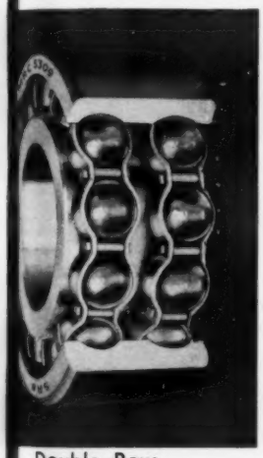


Single-Row—Super-Conrad

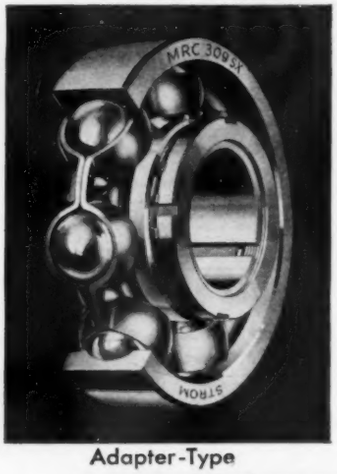


Duplex

Super-Precision

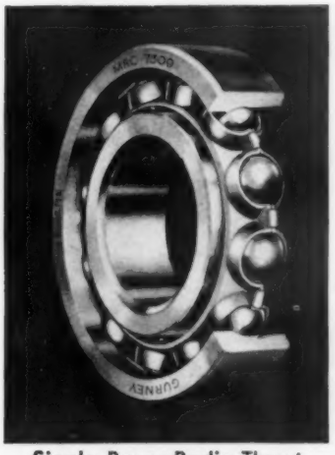


Double-Row

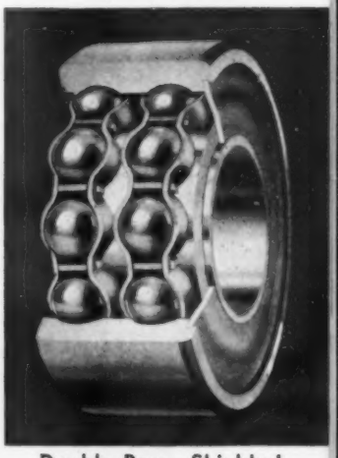


Adapter-Type

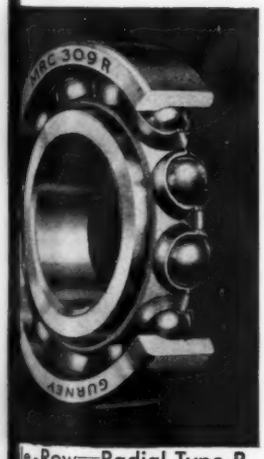
Leadership
M-R-C
STROM
SRB
GURNEY
BALL BEARINGS



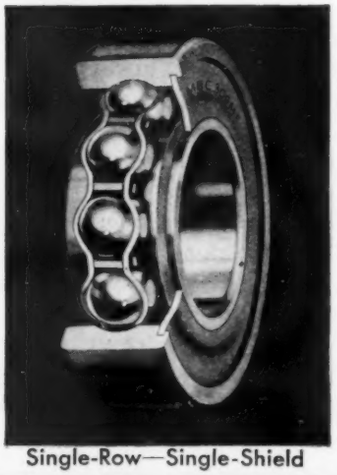
Single-Row—Radio-Thrust



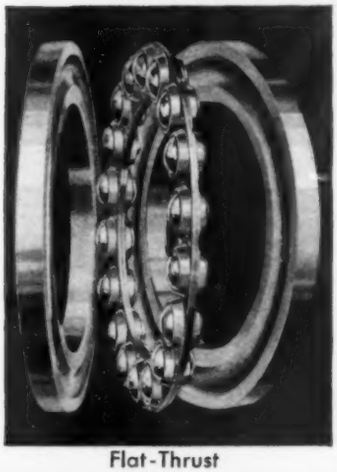
Double-Row—Shielded



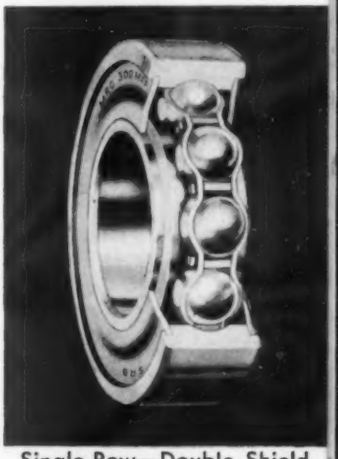
le-Row—Radial Type R



Single-Row—Single-Shield



Flat-Thrust



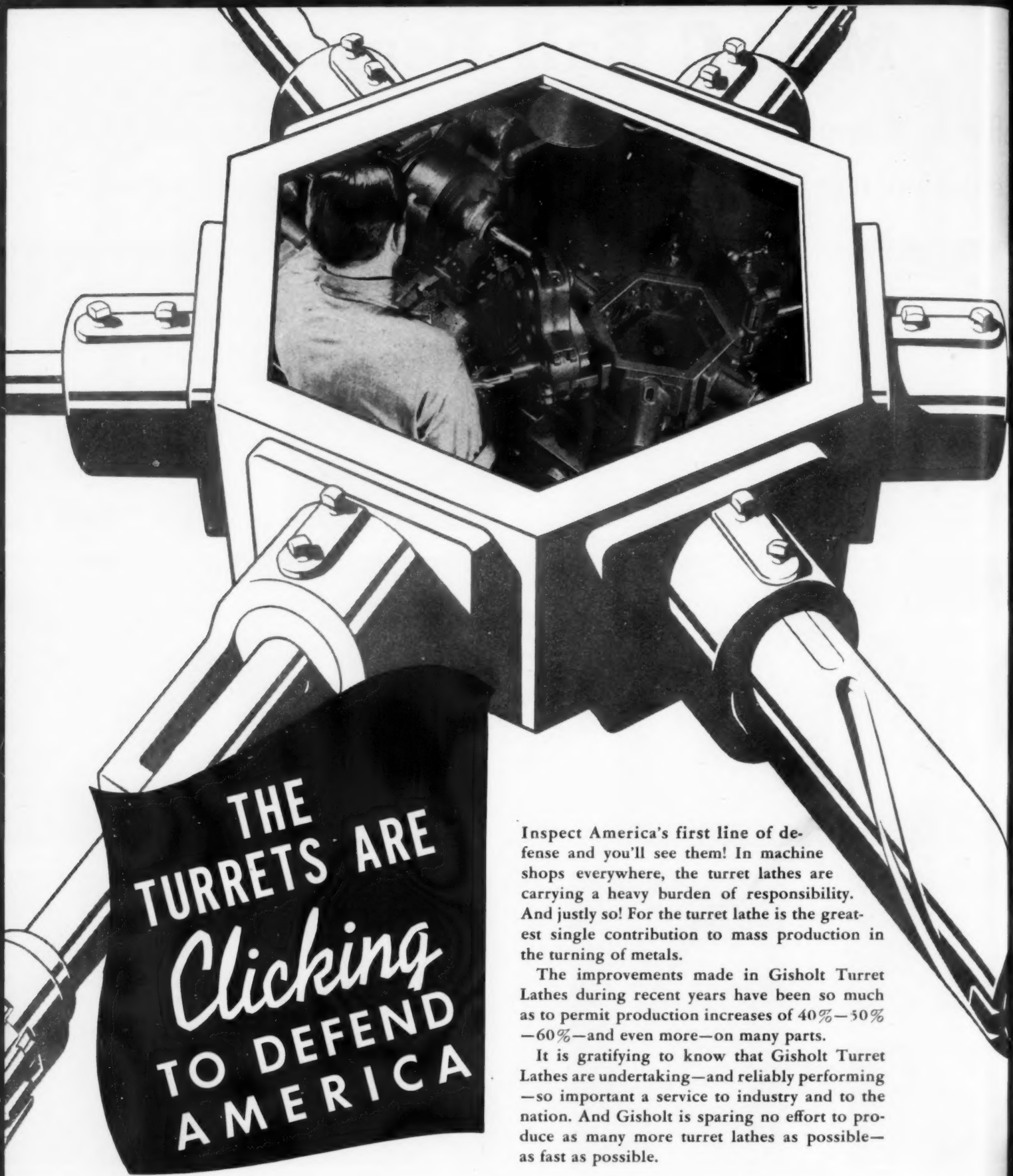
Single-Row—Double-Shield

M-R-C *Ball Bearings*

GURNEY · SRB · STROM

MARLIN-ROCKWELL CORPORATION

Executive Offices: JAMESTOWN, N.Y. *Factories at:* JAMESTOWN, N.Y. . . . PLAINVILLE, CONN.



THE TURRETS ARE *Clicking* TO DEFEND AMERICA

Inspect America's first line of defense and you'll see them! In machine shops everywhere, the turret lathes are carrying a heavy burden of responsibility. And justly so! For the turret lathe is the greatest single contribution to mass production in the turning of metals.

The improvements made in Gisholt Turret Lathes during recent years have been so much as to permit production increases of 40%—50%—60%—and even more—on many parts.

It is gratifying to know that Gisholt Turret Lathes are undertaking—and reliably performing—so important a service to industry and to the nation. And Gisholt is sparing no effort to produce as many more turret lathes as possible—as fast as possible.

Look ahead—keep ahead—with Gisholt improvements in metal turning

GISHOLT MACHINE COMPANY

1201 EAST WASHINGTON AVENUE, MADISON, WISCONSIN

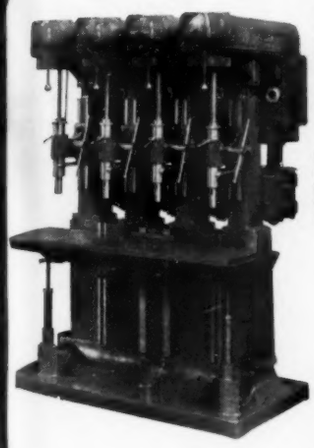
GISHOLT

TURRET LATHES • AUTOMATIC LATHES • BALANCING MACHINES

MAKE SAVINGS *in* 1941 *with* FOSDICK

THE RIGHT DRILL FOR EVERY PRODUCTION NEED

For Small Drilling up to 1¼"



THE FOSDICK HIGH SPEED BALL BEARING SENSITIVE

Available with 6, 9, 12, or 18 speeds, from very low to extremely high spindle speeds. Any number of spindles up to six can be supplied, and any spindle can be provided with power feed, hand feed, or tapping attachment.

Economical operation on large and small jobs

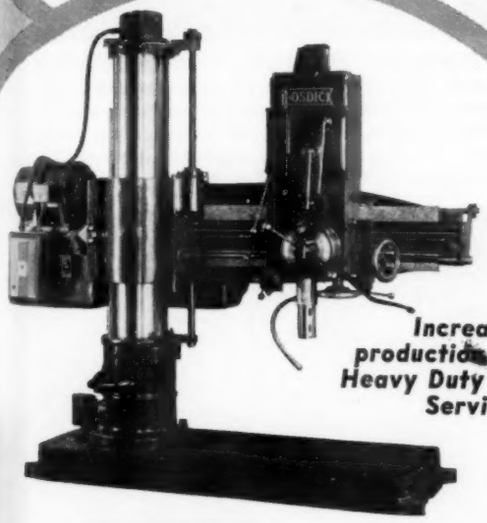
THE FOSDICK JIG BORDER

Enables an average drill press operator to perform accurate work on jigs, fixtures, and miscellaneous production parts and, at the same time, will make small quantities economically possible . . . Fosdick offers you this dual advantage, at a small investment, in this precision machine.

An unusual machine of unusual dimensions for universal work

No. 2—13" SUPERSPEED BALL BEARING . . SENSITIVE DRILL

Built for superspeed production in accordance with the latest drilling practice. Spindle speeds up to 12,000 r.p.m. Spindle is multisplined, made of best high carbon steel, accurately ground, tested to perfect alignment and running balance and has adjustment to take up wear. Fully guaranteed in every respect.

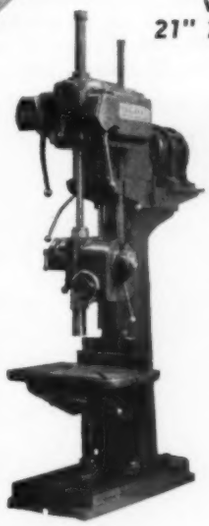


Increased production calls for Heavy Duty Precision Service

THE ECONOMAX HYDRAULIC RADIAL

Rugged construction throughout; 36 spindle speeds; 18 feeds; centralized hydraulic control, with variable hydraulic traverse to the head, hydraulic column clamp and hydraulic arm clam. Many additional features.

High Production on work requiring a 21" 25" or 35" Machine



THE ECONOMAX UPRIGHT SUPREME

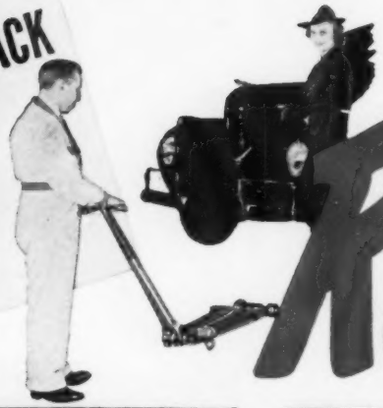
A machine which offers in every one of its many outstanding features a greater inherent ability to improve production through increased capacity, ease of operation, greater accuracy, and economy.

FOSDICK MACHINE TOOL COMPANY

CINCINNATI, OHIO

READ HOW TO Return

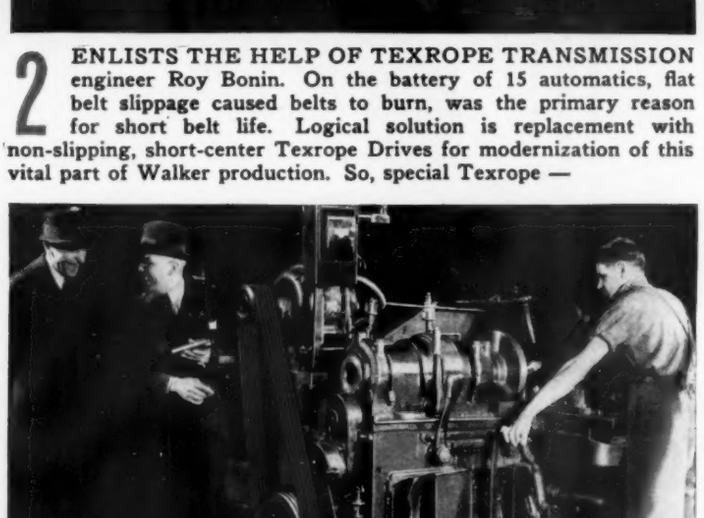
HOW WORLD'S LARGEST JACK MANUFACTURER DOES IT WITH ALLIS-CHALMERS TEXROPE!



1 WORLD'S LARGEST JACK-MAKER — THAT'S THE Walker Mfg. Co., Racine, Wis. Big problem to Walker Foreman, Francis Pfister, is flat belt replacement on automatic screw machines . . . required on an average of every three or four weeks. Since these belts cost $27 apiece, he calls this problem to the attention of Supt. John E. Jensen, who —

2 ENLISTS THE HELP OF TEXROPE TRANSMISSION engineer Roy Bonin. On the battery of 15 automatics, flat belt slippage caused belts to burn, was the primary reason for short belt life. Logical solution is replacement with non-slipping, short-center Texrope Drives for modernization of this vital part of Walker production. So, special Texrope —

3 RIM SHEAVES ARE ACCURATELY MACHINED IN the Allis-Chalmers plant, then pressed on original flat pulleys. As a result, expensive clutch drums inside the flat pulleys need not be duplicated for the V-belt replacements. With minimum production interruption, screw machines are stopped one at a time, pulleys sent to Allis-Chalmers. Soon after —



4 TEXROPE-EQUIPPED PULLEYS ARE RETURNED to the Walker plant, where Supt. Jensen enthusiastically inspects advantages of Texrope V-belt transmission applied to his machines. Now matched sets of genuine, short-centered Texrope belts make these automatics more compact, more efficient, give operators more accurate control. What's more —

TEXROPE DRIVES CUT

INVEST $645 AND GET A

of $10,000 in Two Years!

5 INSTEAD OF PAYING $27 PER BELT EVERY three weeks, Foreman Pfister graphically reports original Texrope belts are completing two years operation . . . *without a single replacement!* Costing initially $43 per unit, these changeovers paid for themselves in less than two months . . . *have saved an estimated $10,000 in belt replacements since!*

6 WELCOME, THEN, TO WALKER PRODUCTION men, is the money-saving story of modern Texrope V-belt transmission. Performance is Texrope's ace salesman . . . and, not only at Walker, but throughout industry in hundreds of varied applications, Texrope is solving many difficult problems, bringing low-cost transmission wherever it is applied!

Here's How You Can Jack-Up Lagging Production Schedules . . . with Allis-Chalmers Texrope! Get the Story of Texrope Co-operative Engineering Service and What it Means to You in Dollars and Cents Savings!

There's more to a drive than just sheaves and belts! That's why . . . before Allis-Chalmers sells a drive, a highly skilled Texrope transmission engineer analyzes your problem . . . figures the kind of drive or transmission equipment that will give you the highest standard of performance and save you dollars at the same time!

What's more . . . you get this valuable *extra-value* feature . . . this *money-saving* co-operative service . . . at *no extra cost!*

No wonder production men in a world of industries make Texrope their first choice . . . call on Texrope for the high degree of money-saving performance only a precision engineered drive can give them!

So get Texrope . . . and get ahead of transmission troubles! Call your nearest Allis-Chalmers district office or Texrope Dealer for the whole story of Texrope's co-operative engineering service!

A 1315

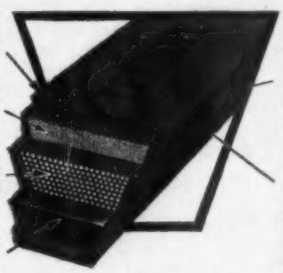
WHEN ORDERING REPLACEMENTS, REMEMBER . . . ONLY TEXROPE V-BELTS GIVE YOU ALL THESE OUTSTANDING FEATURES!

Extra-tough, two-ply cover gives EXTRA-PROTECTION against abrasive wear . . . eliminates need for belt dressing of any kind.

Special bias cut fabric adds transverse strength . . . provides DOUBLE SAFETY against belt breakage.

Rugged load-carrying cords, impregnated in a special, cool-flexing gum insure unvarying length . . . GREATER strength . . . MORE pulling power.

Amazing cool-running rubber compound absorbs shock . . . assures silent, vibrationless operation . . . ACTUALLY INCREASES BELT LIFE 100 TO 200% OVER BELTS OF ONLY A FEW YEARS AGO!



Belts by Goodrich

Texropes are TRUE V-BELTS . . . with famous STRAIGHT-EDGE WEDGE design that gives efficiencies up to 98.9% . . . prevents slipping, jerking. Because they are matched in a special precision measuring machine, sets of Texropes are uniform to a fraction of an inch in length — your guarantee of equalized pulling . . . even wear . . . longer life.

LOOK for the name TEXROPE . . . stamped on every belt! It identifies the only GENUINE Texrope . . . backed by Allis-Chalmers, originators of the multiple V-belt drive. You can get genuine Texropes and Texrope Drives instantly from Allis-Chalmers warehouses and distributor stocks throughout the world.

TRANSMISSION COSTS

Let's PROFIT BY • • •

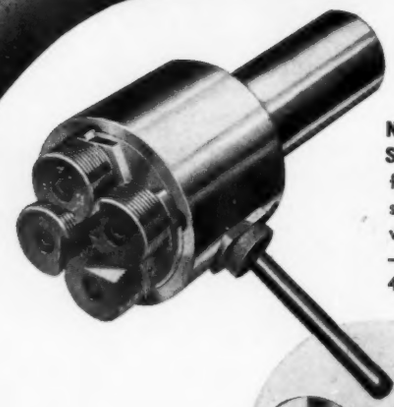
AS OUR DEFENSE PROGRAM gains momentum, more and more buyers appreciate the advantages of a source where equipment for top speed mass production has been *thought out and proved out* far in advance of their needs.

The losses in time and in output that result from trial and error methods of tooling-up are too costly. And any machine or tool that fails to stand the gaff on a 24-hour line of action is a further liability against your profit in the job.

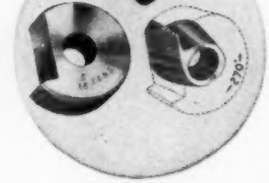
Seven types of National Acme products are here illustrated. Some are complete high production units; others are important auxiliaries to the equipment you now own. None is in any sense experimental.

Literally thousands of the threading tools, oil reconditioning centrifuges, bar automatics and Electrical Mfg. Division products are already engaged in Army, Navy and Aircraft production for defense.

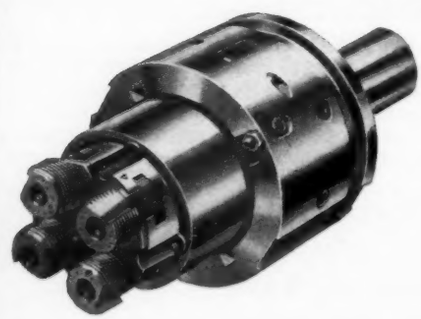
The broad experience we have gained from adapting these products to both common and highly special uses is yours upon request. This ready-made experience will cost you no more—maybe less. Profit by it.



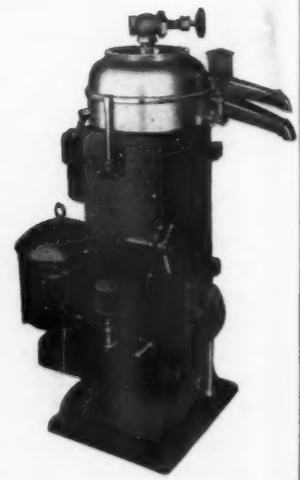
NAMCO CIRCULAR CHASER SELF OPENING DIES—favored for production threading. By a simple change they are converted to hollow milling heads—double duty tools—.056" to 4⅞" capacities. Catalog D-38.



Circular chasers minimize scrap loss, save time between grinds—multiply chaser life 10 to 20 times.



NAMCO COLLAPSING TAPS—quick and positive operating. Equipped with ground thread circular chasers will positively hold size on long run high precision jobs. Other styles cover capacity range 1" to 13⅜". Catalog D-38.



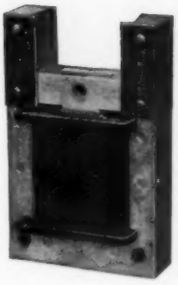
POSITIVE CENTRIFUGE—for oil reconditioning, quickly pays for itself in any production shop where attention is given to oil saving and life of machines and tools. Catalog P-41.

Write for general descriptive information. Or, better still, ask that a sales engineer call to discuss your particular needs.

Ready-Made Experience

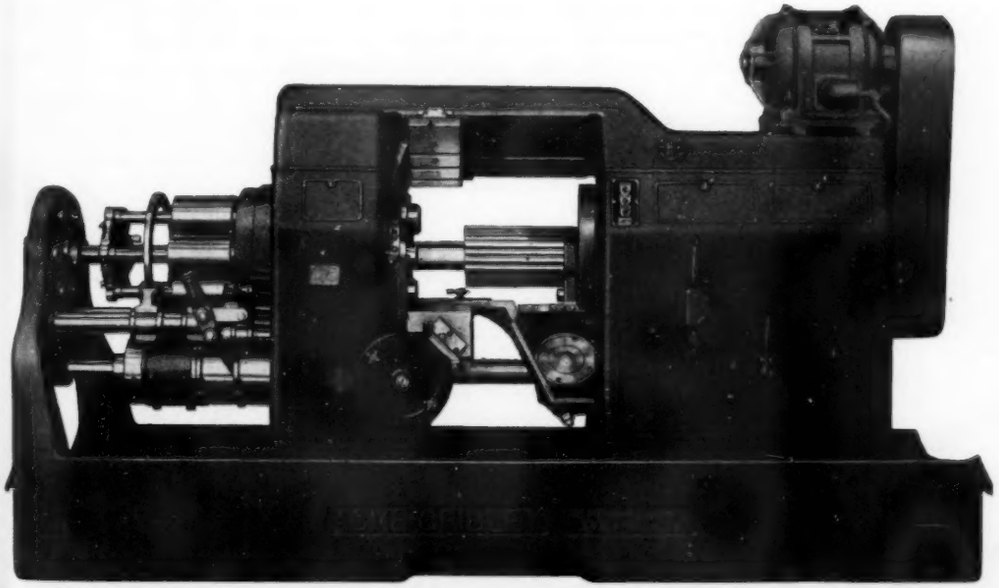
THE CHRONOLOG—prints a record showing why, when and how long any production operation is idle. Gives accumulated count of units produced. Coordinates operations and shows production increases averaging more than 10%. Catalog No. 3707.

SOLENOIDS—designed to meet the heavy duty "stay-put" requirements of machine tool manufacturers. Hardened contact surfaces overcome plunger wear. Less weight, smaller size and higher pull at less amperage. Feet or plate mountings to suit. 4 to 30 lbs. at 1" stroke push or pull.



ELECTRIC COUNTER—with simplified construction—dependable solenoids, working parts of hardened steel, dust proof, legible dial. Rugged throughout, guaranteed electrically and mechanically accurate for life of heavy duty machines at high speed on continuous production.

SNAP-LOCK LIMIT SWITCH—for all normal circuit duty, features 2 double break circuits, separate enclosures for electrical and mechanical sides. Levers to suit. Adopted by over 200 manufacturers as standard built-in switch, used by thousands of others for replacement. "Built with machine tool ruggedness." Free trial.



NEW MODEL RA ACME-GRIDLEY MULTIPLE SPINDLE BAR AUTOMATICS—hundreds of them are engaged in every kind of munitions and commercial work requiring mass output with high precision.

"SUSTAINED ACCURACY... at the fastest feeds and highest spindle speeds that modern cutting tools can safely stand."

NATIONAL ACME

170 EAST 131ST STREET • CLEVELAND, O.

ACME-GRIDLEY 4-6 AND 8 SPINDLE BAR AND CHUCKING AUTOMATICS • SINGLE SPINDLE AUTOMATICS • AUTOMATIC THREADING DIES AND TAPS • SCREW MACHINE PRODUCTS • THE CHRONOLOG • LIMIT SWITCHES • POSITIVE CENTRIFUGE • CONTRACT MANUFACTURING

AUTOMOTIVE BRAKE CAMSHAFT on which spline is hobbed. Hob life increased 50% by use of *Texaco Sultex Cutting Oil B.*

Hob Life increased 50%

They Prefer
TEXACO

★ MORE SCHEDULED AIRLINE MILEAGE WITHIN THE U. S. AND TO OTHER COUNTRIES IS FLOWN WITH TEXACO THAN WITH ANY OTHER BRAND.

★ MORE BUSES, MORE BUS LINES AND MORE BUS-MILES ARE LUBRICATED WITH TEXACO THAN WITH ANY OTHER BRAND.

★ MORE STATIONARY DIESEL HORSEPOWER IN THE U. S. IS LUBRICATED WITH TEXACO THAN WITH ANY OTHER BRAND.

★ MORE DIESEL HORSEPOWER ON STREAMLINED TRAINS IN THE U. S. IS LUBRICATED WITH TEXACO THAN WITH ALL OTHER BRANDS COMBINED.

★ MORE RAILROAD ROLLING EQUIPMENT IN THE U. S. IS LUBRICATED WITH TEXACO THAN WITH ANY OTHER BRAND.

★ MORE TOURISTS USE TEXACO FIRE-CHIEF GASOLINE THAN ANY OTHER BRAND.

CUTTING SPLINES in automobile rear axle brake camshafts in Barber-Colman Hobbing Machines, the life of the hob has been increased 50%. Feed and speed remain as before. The finish is improved.

This unusual improvement was brought about by the use of *TEXACO SULTEX CUTTING OIL B.*

Texaco Sultex Cutting Oils possess the desirable property of constantly penetrating to the very edge of the tool, preventing the chip from welding to it, thus improving the finish. These oils keep all cutters cool, free-cutting, sharp, longer-lived.

The outstanding performance that has made Texaco preferred in this field has also made it preferred in the fields listed in the panel.

These buyers are enjoying many benefits. You, too, will find important advantages when you use Texaco Lubricants and Fuels.

A Texaco Lubrication Engineer will gladly cooperate in making savings in *your* plant. Phone the nearest of more than 2,300 Texaco distributing plants in the 48 States, or write:

The Texas Company, 135 East 42nd Street, New York, N. Y.

TEXACO DEALERS INVITE YOU TO ENJOY

FRED ALLEN in a full-hour program every Wednesday night. CBS, 9:00 E.S.T., 8:00 C.S.T., 10:00 M.S.T., 9:00 P.S.T.

METROPOLITAN OPERA every Saturday afternoon, NBC. See local newspaper for time and station.

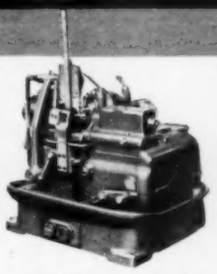
TEXACO Cutting Coolants and Lubricants For All Machining Operations

Let Barber-Colman Work With You..
TO SPEED PRODUCTION, HOLD ACCURACY, CUT COSTS

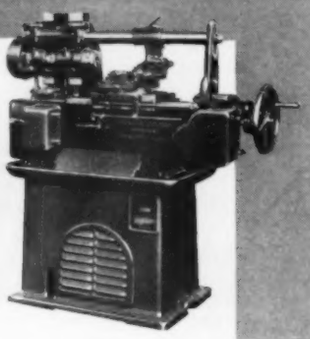
Hobbing Machines..

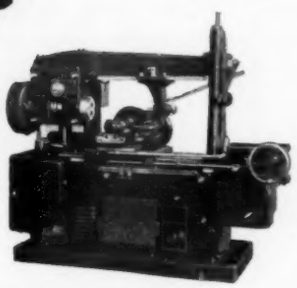
Type V Vertical Hobbing Machine. For accurate high production hobbing. Requires small floor space. Capacity: 8" diameter, 9" face.

Outstanding for accuracy, high production and easy operation; Barber-Colman Hobbing Machines have an exceptional record of accomplishment on many kinds of work. They represent the latest developments in hobbing; are made in six sizes and types ranging in capacity from 1" diameter by ½" face, to 14" by 14". They save time, cut costs, and meet widely varied requirements.

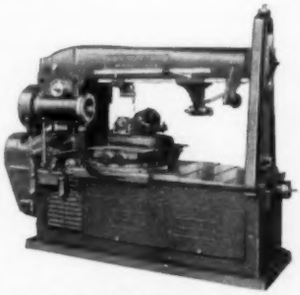


Type S Automatic Hobbing Machine. For mass production of precision small gears.

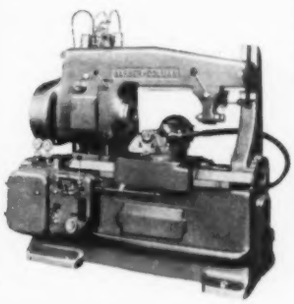




Type A. For general purpose and production hobbing. Capacity: 12" diameter, 12" face.



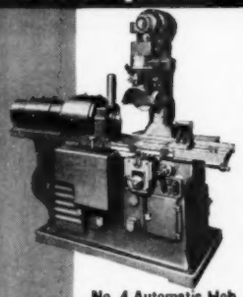
Type T Taper Spline Hobbing Machine. Also does general hobbing within capacity.



No. 3 Standard Hobbing Machine. Capacity: 5" diameter, 7" face. Also built in Precision Type.

Type D Hydraulic Hobbing Machine. For heavy-duty high production. Capacity: 14" diameter, 14" face.

Sharpening Machines..



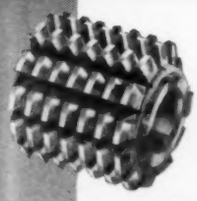
No. 4 Automatic Hob Sharpening Machine.

Barber-Colman Sharpening Machines make correct sharpening easy, economical; reproduce original accuracy and efficiency on straight or spiral teeth.

B-C Automatic Sharpening Machines handle all makes of hobs and formed cutters; No. 3 sharpens up to 4" diameter by 4" face; No. 4, illustrated, sharpens up to 10" diameter, 12" face. *B-C Combination Sharpening Machine* sharpens reamers, hobs and cutters of all makes, in a wide range of sizes; has manual operation, positive mechanical control. *B-C Reamer Sharpening Machine* is designed for quantity sharpening of B-C Reamers exclusively.

Combination Sharpening Machine. Ideal for mixed lots of hobs, reamers, cutters; highly precise, simple to use.

Hobs..Cutters..Reamers..



Barber-Colman Ground Hob.

Hobs

Use B-C Ground Hobs for highest accuracy, finest finish, greatest value; B-C Unground Hobs for commercial limits, low first-cost. Standard or special.

B-C Hobs, "Paraform" Cutters, and Reamers are leaders in profitable performance and reliability. B-C cutter engineers, skilled workmen, and complete specialized facilities maintain unexcelled service.

Reamers

B-C Fluted and Inserted Blade Reamers have unique features which produce fine work fast.

"Paraform" Milling Cutters

Unsurpassed for rapid, accurate milling. All have B-C high quality, distinctive tooth form, long effective life.

B-C "Paraform" Staggered Tooth Side Mill.

Engineering Service..

Barber-Colman hobbing and cutter engineers constantly solve production problems for manufacturers in many different lines. Their extensive experience is available, without obligation, to develop applications of Barber-Colman products that will increase your output and profits.

BARBER B-C COLMAN PRODUCTS

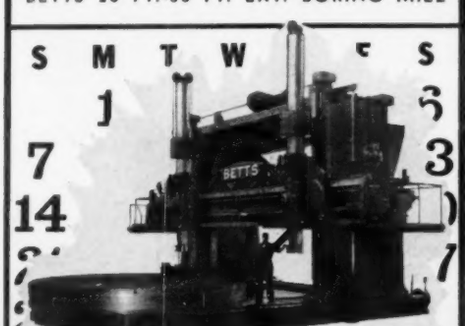
HOBS, HOBBING MACHINES, HOB SHARPENING MACHINES, REAMERS, REAMER SHARPENING MACHINES, MILLING CUTTERS, SPECIAL TOOLS

Barber-Colman Company

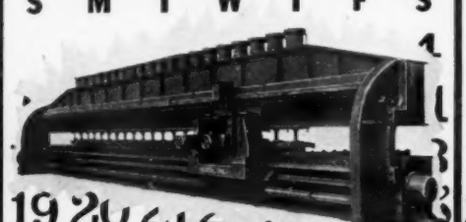
General Offices and Plant 201 Loomis Street, Rockford, Illinois, U. S. A.

OUTSTANDING MACHINE TOOLS OF THE YEAR

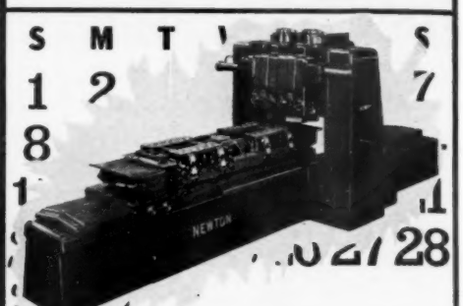
BETTS 20 FT.-30 FT. EXT. BORING MILL



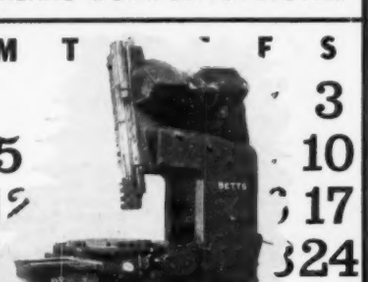
HILLES AND JONES PLATE PLANER



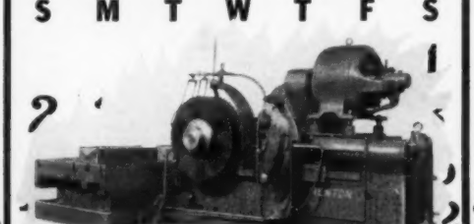
NEWTON MILL-N-SHAVER



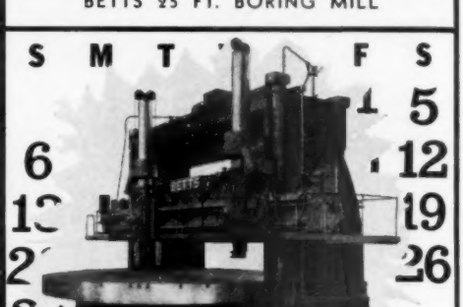
BETTS TILTING WORM DRIVEN SLOTTER



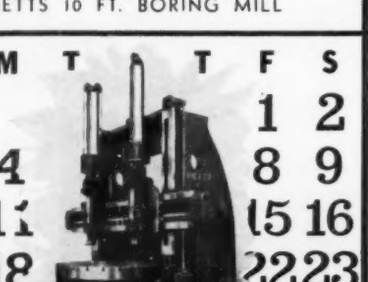
NEWTON HYDRAULIC FEED COLD SAW



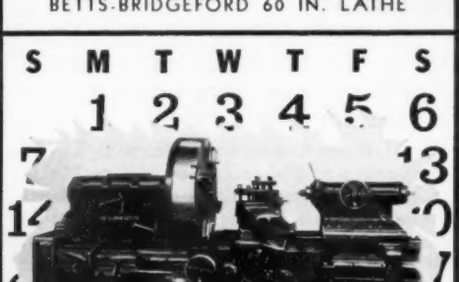
BETTS 25 FT. BORING MILL



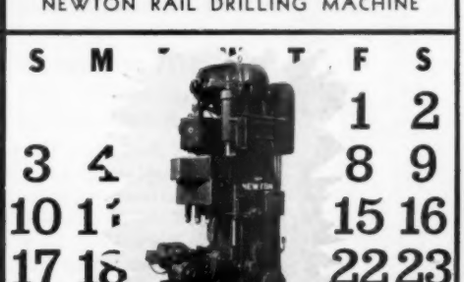
BETTS 10 FT. BORING MILL



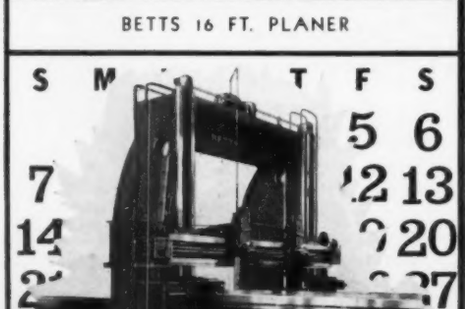
BETTS-BRIDGEFORD 60 IN. LATHE



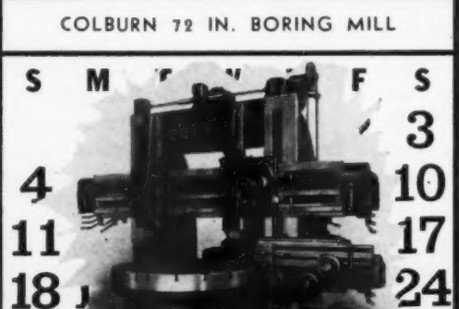
NEWTON RAIL DRILLING MACHINE



BETTS 16 FT. PLANER



COLBURN 72 IN. BORING MILL

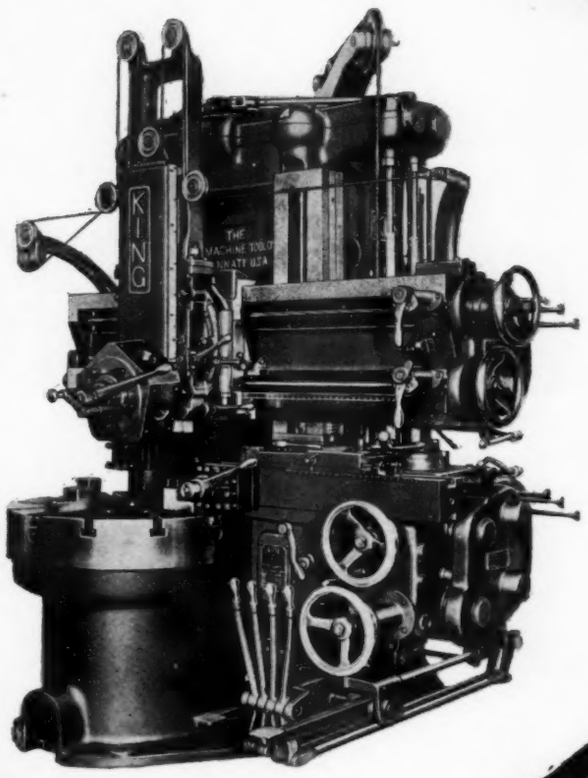


BETTS WORM DRIVEN SLOTTER

DESIGNED AND BUILT
BY
BETTS • BETTS-BRIDGEFORD • NEWTON • COLBURN • HILLES & JONES • MODERN

CONSOLIDATED
MACHINE TOOL CORPORATION
ROCHESTER, NEW YORK

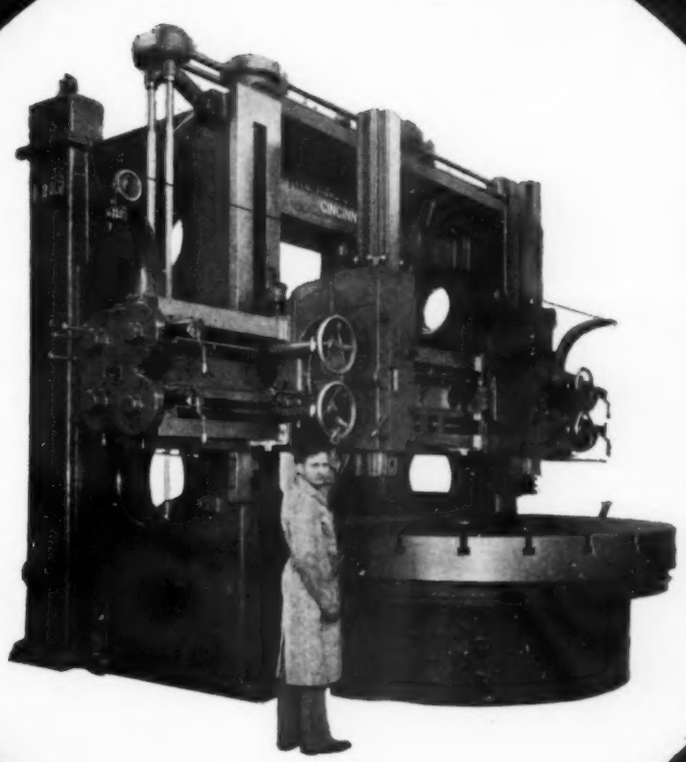
ESSENTIAL to 1941
TURNING and BORING NEEDS



← KING

NEW 30 IN. VERTICAL CHUCKING MACHINE

Table Diameter 30"
Maximum Swing 34"
Maximum Height under rail 24"
Net Weight 20,000 lbs.



KING →

10 FT. VERTICAL BORING & TURNING MACHINE

Table Diameter 120"
Maximum Swing 126"
Maximum Height under rail 80"
Net Weight 140,000 lbs.

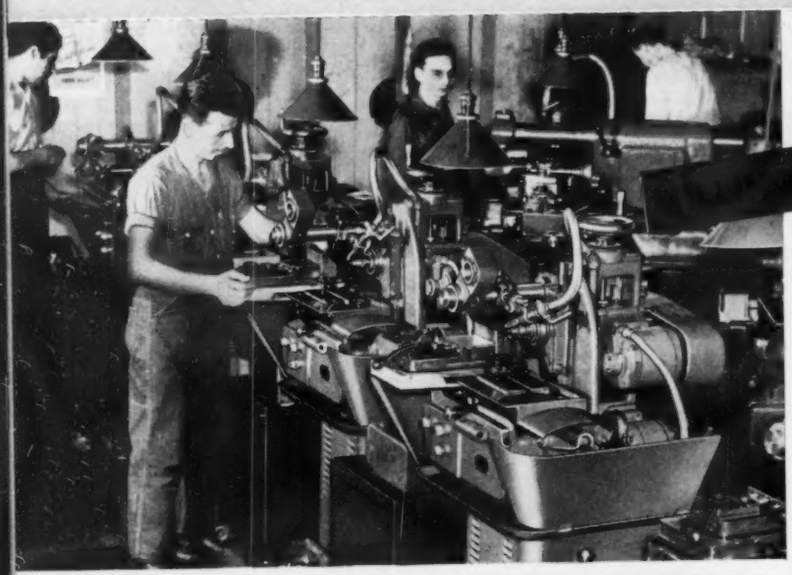
VALUABLE INFORMATION AVAILABLE FOR THE ASKING

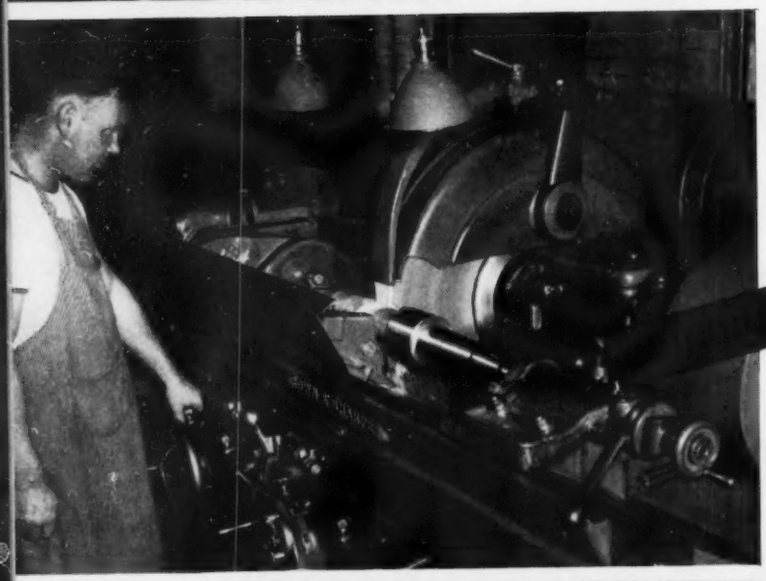
The KING MACHINE TOOL Company

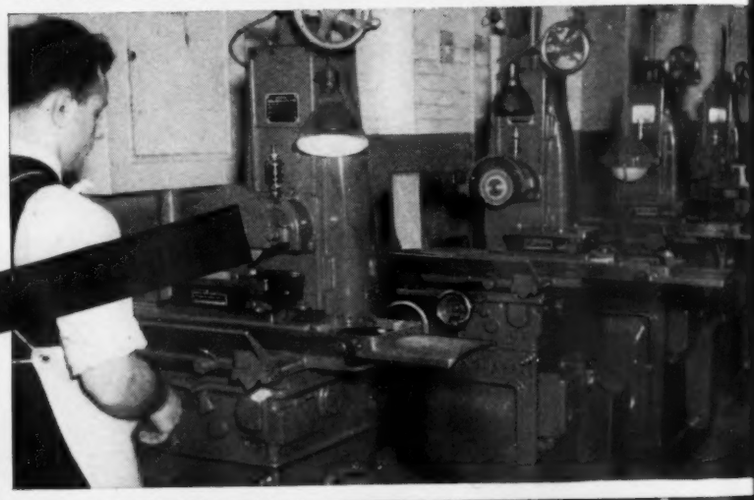
Builders of Vertical Boring and Turning Machines Exclusively

CINCINNATI • • • OHIO

INCREASED PRODUCTION — HIGHER







BROWN &

QUALITY — LOWERED COSTS . . .

— to help you do <u>your</u> part in the defense program

Milling Machines — A wide choice for toolroom as well as production use.

Universal — Plain — Vertical

Milling Attachments

Grinding Machines — For precision work, large and small.

Universal — Plain — Tool — Surface — Cutter

Grinding Attachments

Screw Machines — Efficient types for long or short runs.

Automatic —Wire Feed

Screw Machine Attachments

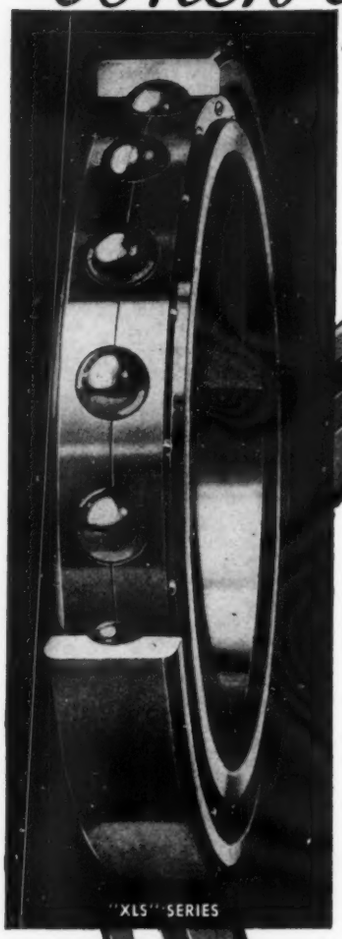
B·S

Catalog describing the complete line gladly sent on request. Brown & Sharpe Mfg. Co., Providence, R. I., U. S. A.

& SHARPE

When You're Cramped for Space

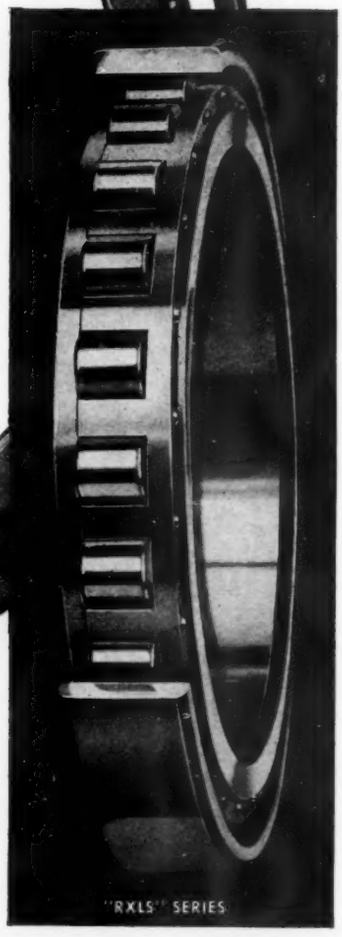
USE THESE VERY LIGHT INCH SERIES BEARINGS



HAVING bores abnormally large, as compared with the outside diameter, they offer definite advantages under certain conditions found in machine design. You may have them in several different types, *affording compactness, light weight, and greater latitude in your design.*

There are several lines of very light type ball bearings, which include the "S" starting at 1/8" bore, and the "XLS" starting at 1 3/8" bore, running up to a maximum of 21" bore and 28" outside diameter. And in very light type roller bearings, there is the "RXLS" Series, paralleling the "XLS" in size range.

Why not let our engineers tell you more about these Very Light Precision Bearings? Write for the Catalog.



"NORMA-HOFFMANN"

PRECISION BALL, ROLLER AND THRUST BEARINGS

NORMA-HOFFMANN BEARINGS CORP'N.—STAMFORD, CONN., U. S. A.

The Cincinnati Bickford

SUPER SERVICE

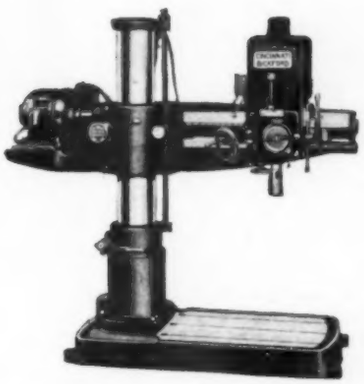
Upright and Radial

METAL DRILLING MACHINERY

Productivity, Capacity, Adaptability, Reliability, Accuracy, Convenience and Economy are the intangible components that give the Cincinnati Bickford line of drills the appropriate name of SUPER SERVICE.

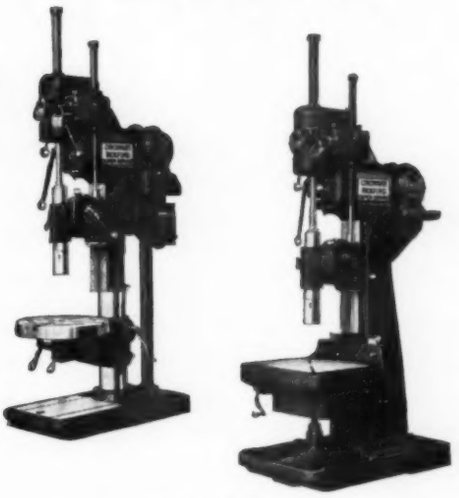
Examine the possibilities of the machines shown here and for further information send for any or all of the bulletins pertaining to the machines that interest you.

THE CINCINNATI BICKFORD TOOL CO.
OAKLEY, CINCINNATI, OHIO **U. S. A.**



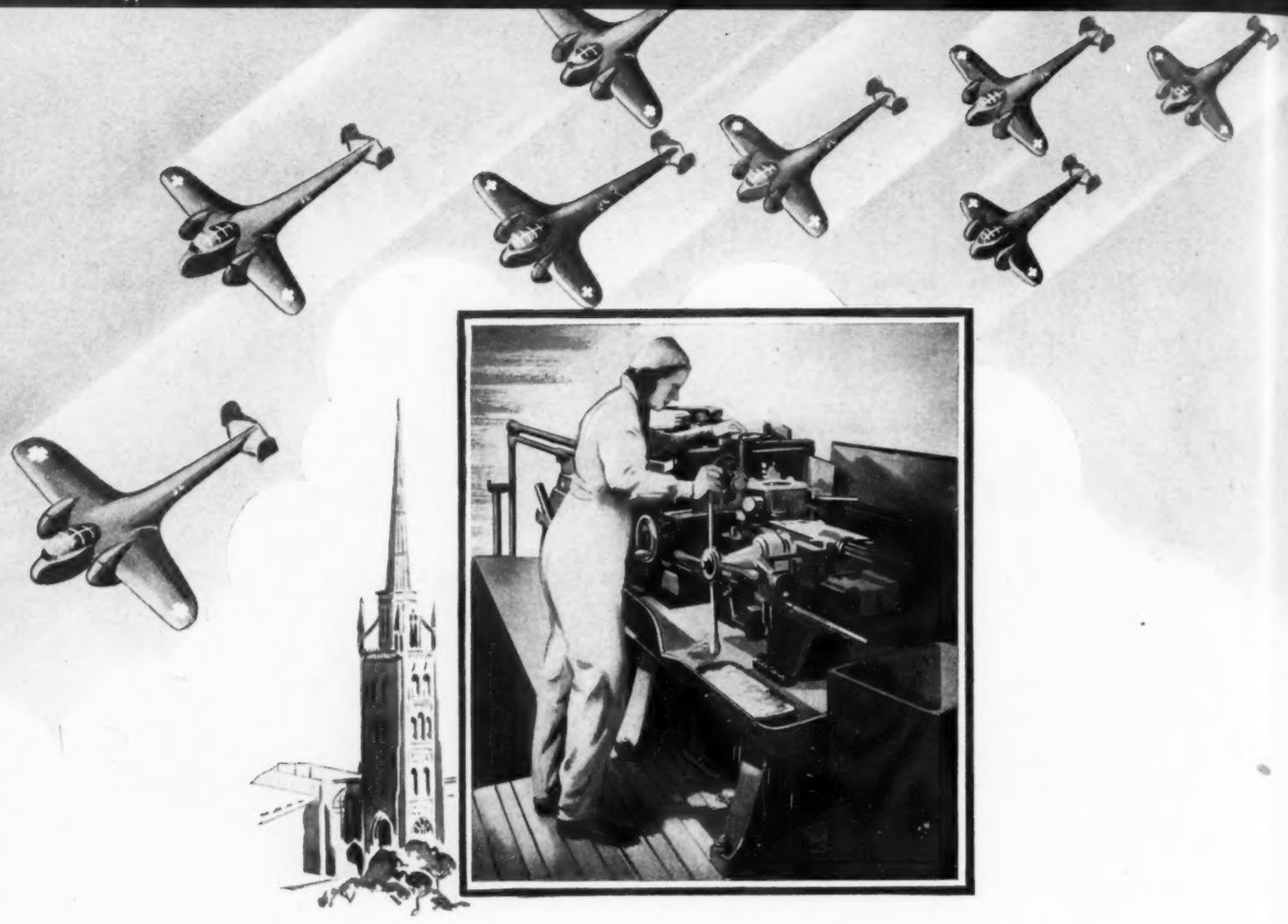
3' or 4' ARM RADIAL WITH 9" COLUMN, BULLETIN R-21-A

3' ARM 11" COLUMN TO 8' ARM 19" COLUMN RADIALS, BULLETIN R-24



21", 24", 28" ROUND AND BOX COLUMN UPRIGHTS BULLETIN U-25

THE CINCINNATI BICKFORD TOOL CO.
OAKLEY, CINCINNATI, OHIO, UNITED STATES OF AMERICA



A picture from Coventry

● British women have had to take the places of men who left their machines to defend their country.

This picture, showing an English girl at work on a Warner & Swasey Turret Lathe, was mailed to us from Coventry.

It came to our desk the very same morning when radios in America were vividly describing the awful bombing which brought death and destruction to that city.

Perhaps this simple picture and the dramatic circumstances surrounding it will give the men at the turret lathes in America a deeper realization of the responsibility which is theirs and ours.

It is the duty of Warner & Swasey to build turret lathes as rapidly as possible; it is *your* duty to produce as much on these machines as is humanly possible.

If you do this, what happened in Coventry can not happen here.

WARNER & SWASEY
Turret Lathes
Cleveland

YOU CAN TURN IT BETTER, FASTER, FOR LESS... WITH A WARNER & SWASEY

WHAT'S IN THIS ISSUE

SMASH HIT

Is it possible! Only a short year ago England was technically at war with Germany, with the battle not yet past the "words and worries" stage. Aircraft makers, you remember, were reporting "satisfactory" increases in orders, chiefly for export. Machine tool people were attributing their increased sales to "the improved business outlook." Germany's air strength was being pooh-poohed, and military experts were ridiculing the idea that a mere airplane could inflict serious damage on a ship.

The U. S. was emerging from a mood of impassioned pacifism into an attitude of resigned resistance. Public opinion still opposed the expense inherent in a two-ocean navy, and "national defense" still meant national defense instead of a sure-fire slogan for selling everything from tornado insurance to tooth paste. Businessmen's major concern was the man the Republicans would nominate to oppose Mr. Roosevelt. The war was still very, very far away; such measures as a peacetime draft and a seventeen billion dollar budget were undreamed of.

How long ago it seems! Now, a British victory is anything but a pushover. The U.S., in the words of the President himself, has been converted into the arsenal for democracy. Or is in the process of being converted. The Machine—that Frankenstein monster which only last May, Senator O'Mahoney was proposing to tax virtually out of existence—has become our last resort with which to defeat the forces of tyranny. Plant expansion, shop equipment, production problems are on the lips of laymen much as were stock prices in fantastic '29. Your newsboy and your milkman can tell you more about plane production or machine tool manufacture than you know yourself. At such a time, when the demand for equipment is unprecedented, a concise, accurate guide to new equipment becomes of tremendous importance. It is just such a guide that this issue comprises. It is our belief that it will prove a smash hit in smashing the bottleneck of equipment procurement.

SPEAKING OF BOTTLENECKS

Of course, everything today is a bottleneck. Aside from machine tools, planes and ships, the papers recently branded labor, capital, housing, transportation, raw material—even shoestrings!—as bottlenecks. With everything a bottleneck, nothing is a bottleneck. You simply have a balanced—if limited—capacity and that's that. But in case you're having trouble getting just the right machine tool for a certain purpose, why not look over some that have been developed in the past year to see whether one of them might not do the job better? Beginning on page 73 are shown over a hundred and sixty new machine tools—all built to modern standards of rigidity and precision.

HANDY HELPS

Close on the heels of machine tools come various accessories used with them. They comprise such devices as work and tool holders, attachments, cutters, gages and hand tools. In the past year about two hundred and fifty new products of this type have been called to our attention, and they are all reviewed in the section which begins on page 175. Many of these tools are brand new, some are major improvements on previous models. All are designed to do a job better, quicker, cheaper.

HEAVY STUFF

Closely allied to machine tools in the lay mind are such heavy machines as presses, brakes, forging machines and molding equipment. Some seventy machines of this type were announced during 1940. Increased capacity and better accuracy characterize many of them. A look through the section beginning on page 237 might show that these improvements can make possible simpler manufacturing methods.

WELDING, ETC.

On page 267 begins a comprehensive section which embraces equipment for welding, heat-treating, cleaning and finishing. Almost two hundred new items are included. Now is certainly the time to modernize that heat-treating department, or expand welding facilities. And there is still time to install additional cleaning and finishing equipment before too heavy a load falls on these departments under the press of the defense program.

SERVICE

When output is boosted and floor space increased, plant service departments are often given an additional burden without extra facilities. Thus any improvement to increase efficiency of materials handling, power transmission or general maintenance will be a profitable investment. About two hundred such improvements are listed in the section which starts on page 297. Described is practically everything for the modern plant.

MATERIAL AID

Certainly there are many manufacturing headaches which would be cured if only the "right" materials could be found. Maybe some of those listed in the section beginning on page 333 will prove the answer to one of your problems. Also in this section are many new processes which could be of equal worth. Included, too, are over a hundred complete machine parts. All of which can be of material aid in getting those orders out in a hurry, so your customer can get *his* orders out in a hurry, and so on until we've at last got all those guns and tanks and ships and planes we need so sorely.

CLASSIFIED

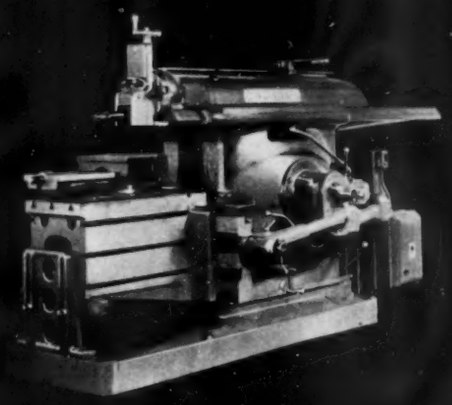
In the foregoing sections are included only those machines which have been made available during the last year. But in case you're not interested in the very latest equipment this issue will still prove of tremendous value. For on page 401 begins a complete where-to-buy directory, in which are listed manufacturers of nearly every piece of metal-working equipment in the country. It's classified, subdivided and alphabetized for your convenience.

COMING

You've read items on shell, and reports on shell, and articles on shell. But you've never read anything that even approaches the series of articles on shell making soon to appear in AMERICAN MACHINIST. To be a feature of the Armament Section for many issues to come, this series will reveal *in detail* virtually everything production men need to know in tooling up for shell manufacture. Material for it has been compiled with the consent of the War Department and with the cooperation of companies actively engaged in shell production. Since much of the information has previously been regarded as strictly confidential, we know you've never seen anything like it published before. But you can expect it in AMERICAN MACHINIST!

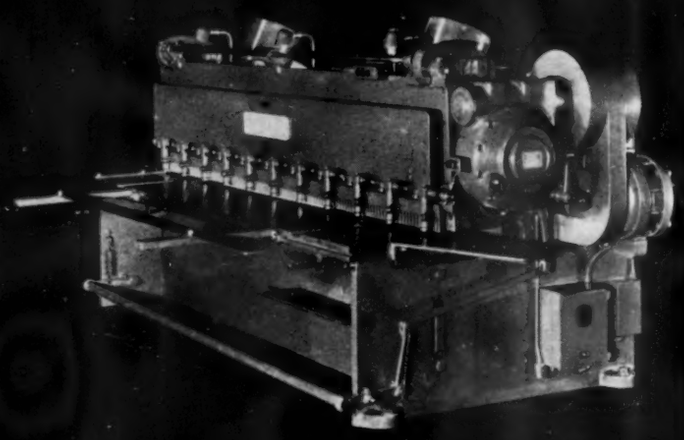
Cincinnati
Power Rapid Traverse
SHAPERS

Cincinnati Shapers are built in plain or universal table types from 16" to 36". Their power rapid traverse, multiple cam feeds, automatic oiling, simplified adjustments, and means for quick, easy set-up sell the man who buys for results in the tool room and die shop. Write for Catalog N-1.



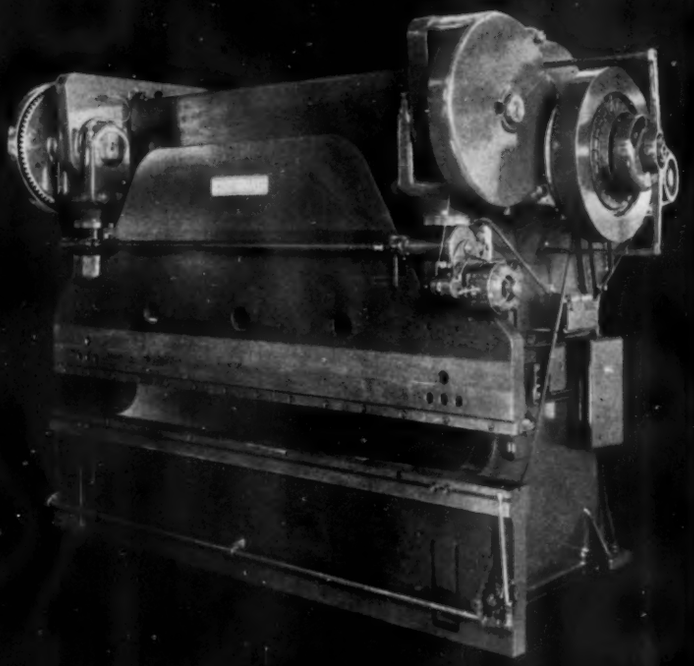
Cincinnati
All-Steel
SHEARS

A machine tool for shearing, squaring, notching or slitting metal. Sizes for every requirement from 0.005" aircraft alumium alloy to 1¼" steel plate. All steel construction, hydraulic hold-downs, micrometer ball bearing back gauge, and positive knife adjustment give speed and accuracy. Write for recommendations on your job.



Cincinnati
All-Steel
PRESS BRAKES

These are the modern machines for bending, corrugating, flanging, forming or multiple punching sheet metal and steel plate. Built in a machine tool plant to machine tool standards. Sizes from 75 to 1,000 tons or more for working material from light aluminum alloys to heavy armor plate. All-steel construction, deep bed and ram plates keep the dies parallel under full load . . . consistently produce uniform parts that fit together easily. Write for recommendations on your job.



THE CINCINNATI SHAPER CO.

SHAPERS · SHEARS · BRAKES

CINCINNATI, OHIO.

ESTABLISHED 1877 **AMERICAN MACHINIST** BURNHAM FINNEY, Editor

Arming America's Industry

NEW EQUIPMENT has another meaning this year. It means not merely the acquisition of machinery for turning out a peace-time product, but it forms a vital part of our national defense.

For this reason AMERICAN MACHINIST'S 28th Buyers Reference Number takes on added value. It will serve as a means of selecting the right tool for the right job and so contribute to the process of equipping for national defense.

Following the pattern of previous years, this number reviews by picture and caption the metal-working equipment and new materials that have been announced in the pages of AMERICAN MACHINIST during the past year.

Industry's job during 1940 has been to adapt existing lines of equipment to the new problems presented by the manufacture of armaments and to create new designs specifically planned to this end.

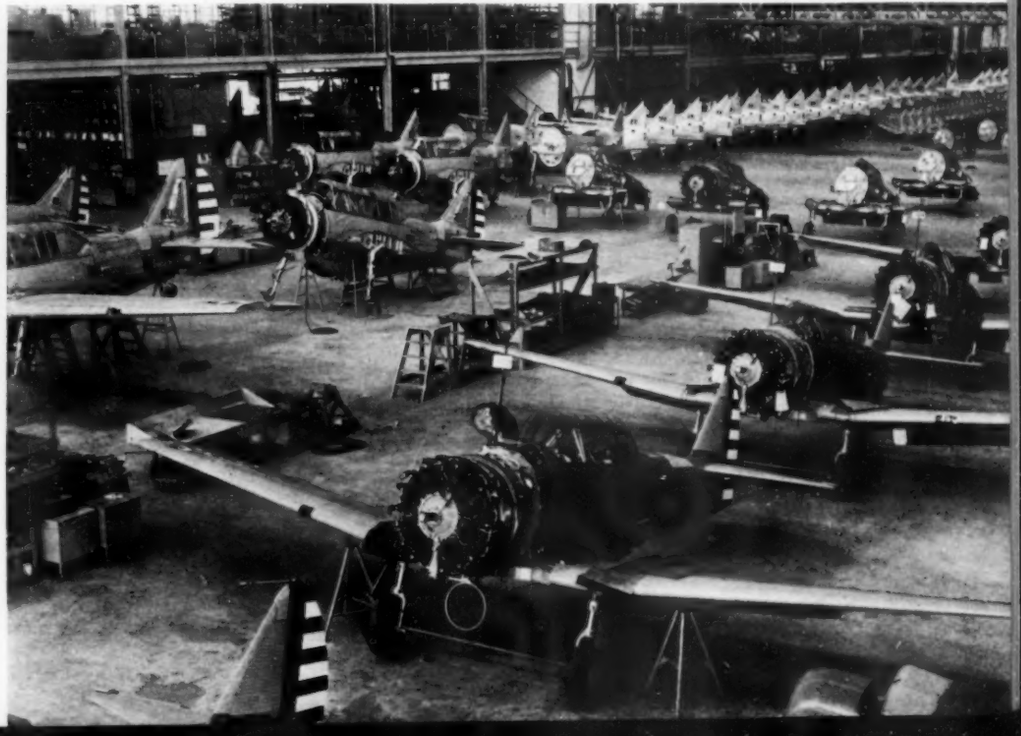
Other than the special equipment directed particularly to the manufacture of ordnance items, metal-working methods, during 1940, saw intensification of previous trends rather than radical departures in technique. In machine tool design, for example, manufacturers have continued to work toward three main objectives: improvement of the product, safety of the operator and increased production. The tendency toward the use of multiple cuts has continued together with close control of operations by means of electrical or hydraulic devices, or combinations of the two. Higher speeds have been achieved by the more extensive use of improved cutting materials.

The machine tools themselves have been protected by the improvement in and wider application of automatic lubricating devices. Some of these definitely measure a given quantity of lubricant for use on various wear surfaces. Another arrangement requires that a specified pressure be built up in the lubricating oil film before a switch is operated which permits the machine to be set in motion.

Wider use of surface broaching, noted during the past few years, has continued with some novel applications. One of these is the introduction of circular broaching by means of which circular key slots and similar surfaces may be cut in a single pass of the tool.

Several new instruments have been introduced to measure surface finish, thus giving the inspector a quantitative means of determining surface quality. A combination of better abrasives, plus improved equipment for using them, is aiding the move toward better surfaces.

Because of the high degree of activity in the aircraft and automotive industries special attention has been given to press work. For large aluminum sheets it has been found unnecessary in many cases to use all-metal dies; rubber as a



Welded construction continues to grow in popularity • Rapid expansion of the aircraft industry was a major trend during 1940

Higher standards of accuracy have put new demands on the machine tool builder

blanking and forming medium has come into use. Another method of reducing die cost is employment of low melting non-ferrous alloys which can be formed to the desired shapes more readily than iron or steel.

Flaws in steel products are now the subject of special examination in a variety of ways. The Magnaflux magnetic test and the X-ray are already familiar, but there are a number of new methods for continuous magnetic inspection that takes the guess work out of the internal structure of steel parts.

Flame cutting and welding as means of metal fabrication continue to move forward at a rapid rate. There are today on the market a wide variety of devices for controlling the path of the cutting flame. At the National Metal Exhibition, held in October, one manufacturer alone demonstrated 19 different models of flame-cutting equipment. Such equipment enables the operator to cut straight, circular or irregularly shaped pieces from steel plates, either one at a time or in multiples. These pieces used in arc welded fabrication give strength combined with lightness and avoid the possibility of blow holes or similar flaws. Since the demand for competent welders has been great, one concern has a device which automatically records a welder's performance.

For aircraft assemblies, considerable work has been done on the subject of spot-welding aluminum sheets. Several makers of equipment have announced a solution to this problem, and are supplying equipment for the purpose to the aircraft industry.

The chemistry of furnace gases has been further studied in heat-treating operations, with a view to controlling the rate of carburization or decarburization within the furnace and the prevention of troublesome scale formation. One furnace manufacturer is now offering a bell-type furnace in which the work is covered while being surrounded by a specially prepared gas. Other ingenious means have been devised to prepare and control furnace atmosphere to meet specific conditions.

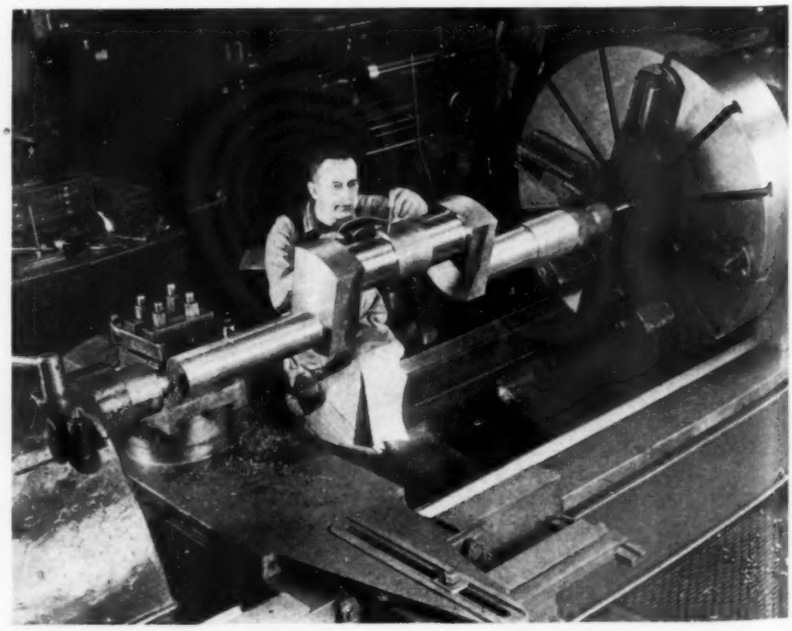
Induction heating for heat-treatment has grown fast and can now be used on small lots as well as in mass production. Another development in this direction is the use of induction heating to bring steel bars up to forging temperature, particularly for manufacture of shell.

Flame hardening, originally applied to the teeth of very large gears, continues to crop up in new forms and has established itself as a distinct accepted method for hardening a wide variety of parts.

In the field of metal finishing, radiant heat is becoming more and more popular. The heat may be radiated from gas burners or from infra-red electric lamps. It is claimed that these methods are more economical than oven baking for many kinds of paint and lacquer. Plated finishes are being improved by the use of newly developed solutions which give the product a bright finish without the necessity for laborious buffing and polishing operations. Research in this direction has also speeded the plating cycle.

The major job for 1941 is to utilize the new methods to the fullest extent in the National Defense program. It is evident that the war in Europe is a mechanized war; preparation for war consists largely in the manufacture of metal products needed by the army and navy. This country's ability to produce these weapons will form a measure of its security and its ability to guide its own destinies in a future clouded with uncertainty.

Putting modern equipment to work is the big job for 1941



CLASSIFIED INDEX OF EQUIPMENT

PAGE

MACHINE TOOLS 73

Boring Machines 75
Broaching Machines 77
Cut-Off and Filing Machines 78
Drilling and Reaming Machines 79
Gear Cutting and Finishing Machines 80
Grinding and Honing Machines 82
Lathes and Screw Machines 88
Milling Machines 93
Planers and Shapers 99
Tapping and Threading Machines 101
Miscellaneous Machines 104

TOOLS and ACCESSORIES 175

Work Holders 177
Tool Holders 180
Attachments 181
Punching Units, Dies 182
Coolant Systems and Lubricators 183
Production Counters and Cycle Timers 184
Grinding Wheels and Dressers 185
Cutters 186
Tool Materials 187
Measuring Tools, Gages, Inspection Machines . . . 188
Portable Tools 192
Hand Tools 196

PRESSES, FORGING and MOLDING MACHINES . 237

Mechanical Presses 239
Hydraulic Presses 240
Shears and Brakes 245
Forming Rolls and Benders 247
Forging Machines 248
Die Casting Machines 249
Plastic Molding Machines 250

PAGE

WELDING, HEAT-TREATING, CLEANING and FINISHING 267

Furnaces and Heaters 269
Temperature Measurement and Control 272
Heat-Treating Accessories and Supplies 273
Welders 274
Welding Accessories and Supplies 279
Polishing Machines and Supplies 282
Cleaning and Drying Equipment 284
Rust Preventatives, Cleaning Compounds 285
Plating Equipment and Supplies 285
Paint Spray Equipment 286
Paints, Lacquers, Enamels and Primers 286

PLANT SERVICE EQUIPMENT 297

Trucks 299
Hoisting Equipment 302
Drives, Transmissions and Reducers 304
Hydraulic Pumps 305
Belts, Clutches, Couplings and Pillow Blocks 306
Lighting Equipment 307
Unit Heaters and Fans 309
Air Compressors and Cleaners 309
Drafting and Blueprinting Equipment 310
Safety Equipment and Supplies 311
Maintenance Equipment 313
Miscellaneous Equipment 314

PARTS and MATERIALS 333

Electric Motors 335
Other Electrical Equipment 337
Machine Parts 339
Bearings 340
Valves and Fittings 340
Processes 342
Materials 342

Users of all types of

PRODUCTION MACHINES

The popularity of Vickers Hydraulic Controls with leading builders and users of production equipment results from its proven performance and its many definite advantages. The most complex controls and motions are accomplished with relative simplicity. Any desired thrust at any given point and any practicable speed of movement is easily provided. Using oil as the working fluid, operation is smooth and positive while the machine is protected against overload and the control inherently lubricated. • There are 4,000 standardized Vickers (Oil) Hydraulic Pump and Control units now available. Vickers engineers will gladly help you select the equipment best adapted to your particular requirements.

VICKERS *Incorporated*, 1410 Oakman Boulevard
DETROIT, MICHIGAN

prefer

VICKERS HYDROMOTIVE EQUIPMENT

Machine Tools

BORING MACHINES • BROACHING MACHINES • CUT-OFF AND FILING MACHINES • DRILLING AND REAMING MACHINES • GEAR CUTTING AND FINISHING MACHINES • GRINDING AND HONING MACHINES • LATHES AND SCREW MACHINES • MILLING MACHINES • PLANERS AND SHAPERS • TAPPING AND THREADING MACHINES

AMERICAN MACHINIST'S 28TH ANNUAL BUYERS REFERENCE NUMBER

for GEAR PRODUCERS

Another Real Service from Gear Production Headquarters

In keeping with our aim of being of maximum service to gear producers in connection with their gear production problems, we are pleased to announce that a new "Tables" booklet is now ready for distribution.

Included in the 40 pages of useful data in this booklet are:

1. New and simpler hobbing machine change gear formulae and tables.
2. Formulae for checking gears by ball and pin methods.
3. Complete tables of decimal equivalents of fractions.
4. Hobbing speed tables.
5. Formula for checking hobbing time.
6. Descriptions of hob-checking equipment.

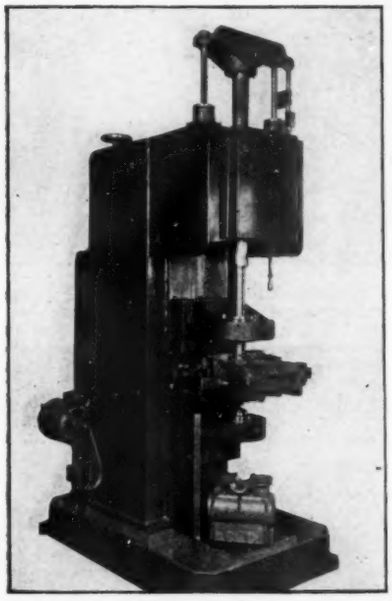
A limited number of copies of the new booklet (No. 266-41) are available without charge to gear production men. May we send you your copy? (In writing please give your company connection.)

And this is but *one* of many practical printed aids to gear producers provided by 'Gear Production Headquarters'. Also available are such reference and shop booklets as "Hobbing", "Better Gears", "Gear Finishing", "Gear Cutting Tools",—and our monthly bulletin "Production Highlights". (Are you on the mailing list?)

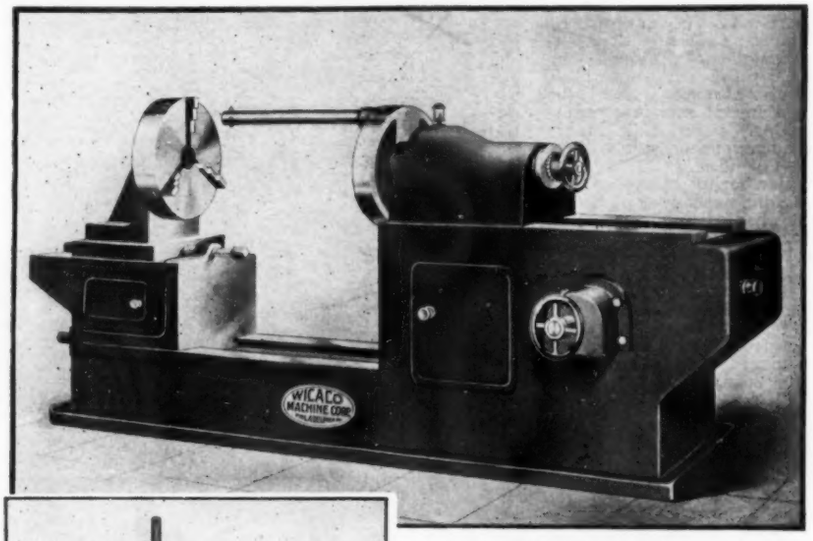
MICHIGAN TOOL COMPANY

7171 East McNichols Road Detroit, U. S. A.

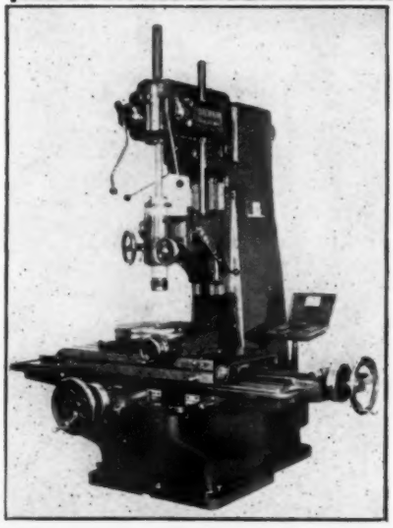
MACHINE TOOLS



BORING MACHINE—*Giern & Anholtt Tool Co., 1312 Mt. Elliott Ave., Detroit, Mich.* Model W 101 "Carbideborer" carbide and diamond boring machine semi-finishes and finish bores deep holes. Hydraulic spindle travel is 20 in. Bore diameter ranges from 2 to 5½ in. Vol. 84, p. 107.



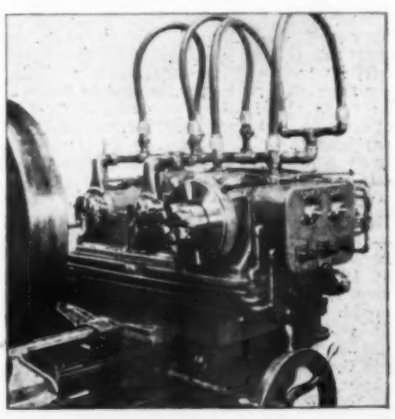
OIL GROOVER — *Wicaco Machine Corp., Stenton Ave. & Louden St., Philadelphia, Pa.* "Wicaco" heavy-duty horizontal oil groover comprises a high-speed production machine suitable for holding odd-sized, irregularly shaped machine members for grooving. Maximum groove length is 22 in.; maximum groove diameter, 20 in. Vol. 84, p. 148.



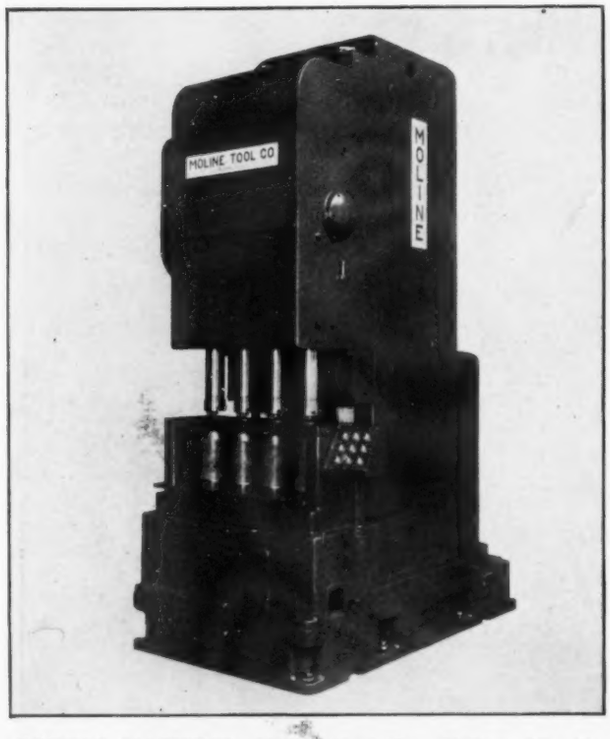
JIG BORERS—*Bryant Machinery & Engineering Co., 400 W. Madison St., Chicago, Ill.* "Cleereman" jig borers are available with power rapid traverse for table and carriage. A two-jaw clutch engages either traverse handwheel or the power rapid traverse worm gear. When power rapid traverse is engaged, the handwheel is disengaged and does not rotate. Fine feed handwheel is located on the end of the vertical motor shaft and utilizes the same worm and gear as the power rapid traverse. Limit switches are provided at each end of the travel to prevent accidental overtravel. Vol. 84, p. 520.

PRECISION BORERS — *Ex-Cell-O Corp., 1224 Oakman Blvd., Detroit, Mich.* "Junior" and "Senior" precision boring machines incorporate improved hydraulic control. Graduated orifice dials control first and second feeds and dwelling time at each end of table stroke. Capacity of the "Junior" machine is ⅜ in. minimum and 6 in. maximum diameter hole; 12 in. maximum table travel; ½ to 40 in. per min. table feed and 15 ft. per min. rapid traverse. The "Senior" bores holes to 8 in. maximum diameter; has 16 in. (single end) and 15 in. (double end) maximum table travel; 1¼ to 18 in. per min. table feed; and 10 ft. per min. rapid traverse. Vol. 84, p. 28.

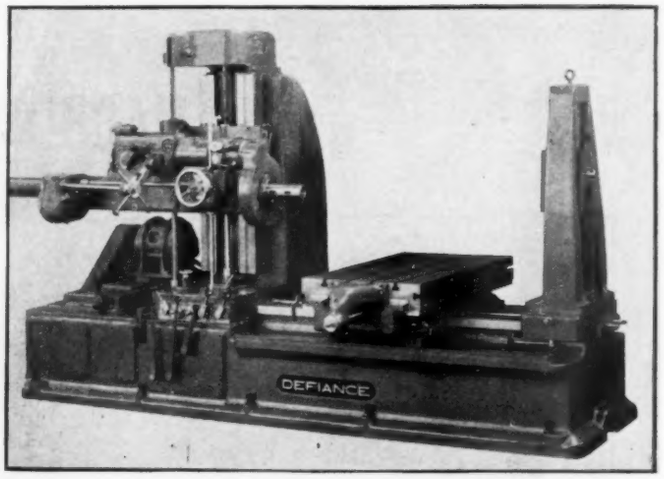
CASING MACHINE—*Landis Machine Co., Waynesboro, Pa.* This recessing, boring and tapping machine finishes completely internal or tapped ends of integral joint type casing at one chucking. Similar to the mill type receding chaser pipe threading and cutting-off machine, this device employs a special carriage on which are mounted recessing, boring and tapping tools. All movements of tool slides and cross slide are hydraulically controlled, with the circuits arranged with interlocks to assure correct operating sequence. Vol. 84, p. 1098.



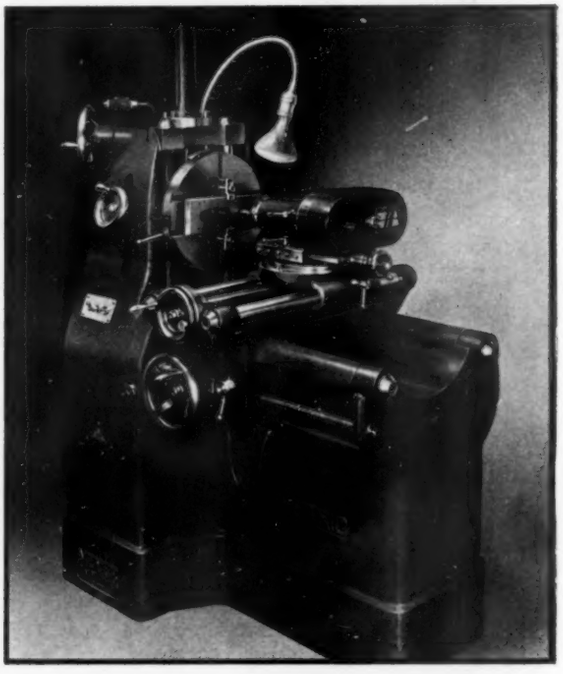
MACHINE TOOLS—Boring Machines



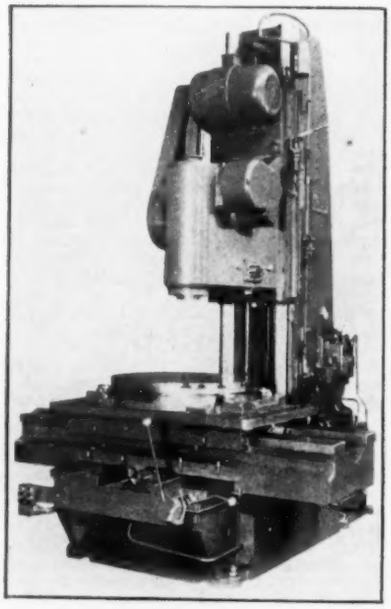
BORING MACHINE—*Moline Tool Co., Moline, Ill.* No. 116FB four-spindle precision cylinder block boring machine bores ⅝-in. diameter sleeves of about 200 Brinell with a cutting speed of 550 ft. per min. at a feed such that sleeves 11 in. long are bored in 1 min. 35 sec. Hydraulic feed has automatic electric pushbutton cycle control. Vol. 84, p. 147.



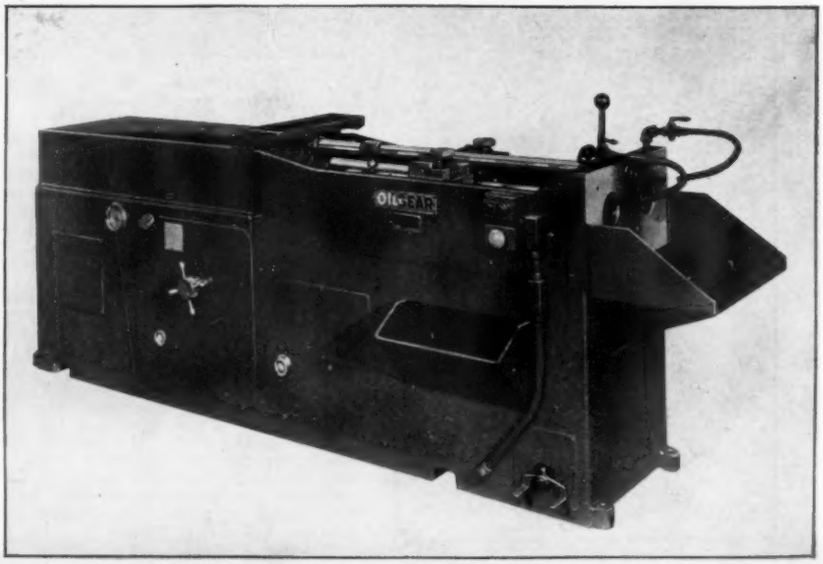
BORING MACHINE—*Defiance Machine Works, Inc., Defiance, Ohio.* No. 25-A horizontal boring, drilling and milling machine has twenty speeds from 12 to 1,000 r.p.m., and can be equipped with an additional low-speed arrangement giving twenty more speeds from 4 to 420 r.p.m. Spindle sleeve rotates in Timken bearings. Shave finished helical gears are used in the head. Outboard supports under the table are integral with the base. Standard table is 30x60 in., with full 60-in. cross travel. Machine shown is available in 5, 6, and 8 ft. bed lengths and with 30, 36, 42 and 50 in. head travel. Vol. 84, p. 938.



JIG BORER — *Meyer Machanical Laboratory, 1849 Sacramento St., San Francisco, Calif.* "Autometric" jig borer also serves as a universal layout and inspection machine. Operations include: locating, boring, inspecting and layout in one set-up; angular boring at any angle; and rapid measuring by built-in mechanical counters. Features of this machine include steel ways which are hardened, ground and lapped and provided with automatic lubrication; independent speeds and feeds; infinite number of feeds from zero to 3½ in. per min.; fourteen feeds from 30 to 2,350 r.p.m. Vol. 84, p. 591.

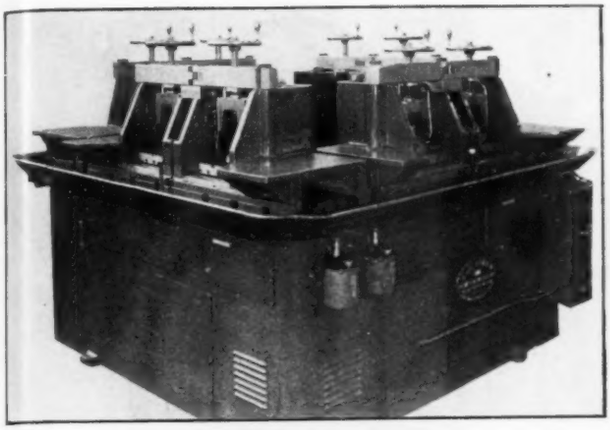


BORING MACHINE—*Moline Tool Co., Moline, Ill.* Hydraulically actuated table and hydraulic feed of the spindle carriage are features of the No. HF-145 single-spindle boring machine. Boring spindle is adjustable for four different spindle speeds from 26 to 84 r.p.m. Hand lever controls vertical travel of spindle carriage and table motions. Spindle carriage travel is 36 in., table travel to and from column is 20 in., table cross travel is 40 in. Vol. 84, p. 639.

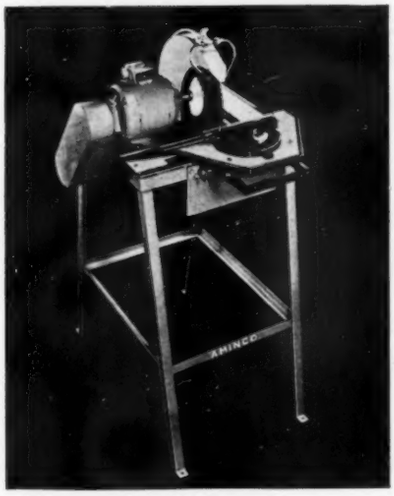


HORIZONTAL BROACHING MACHINE —*Oilgear Co., 1302A W. Bruce St., Milwaukee, Wis.* Having a normal pulling capacity of 12,000 lb., Type XB-12 twin horizontal broaching machine incorporates a simple pushbutton and alternative toe-lever control. It is designed especially for high speed internal and external broaching on small and medium sized parts. Specifications: normal capacity, 12,000 lb.; peak pulling capacity, 18,000 lb.; cutting speeds, 4 to 30 ft. per min.; broaching stroke, 36 in. Vol. 84, p. 436.

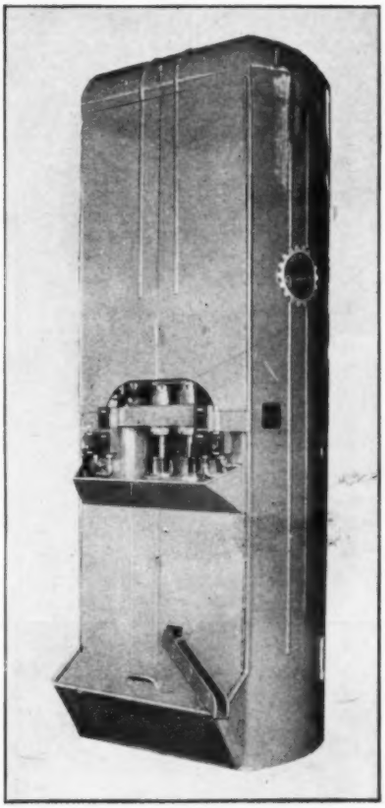
Broaching and Cut-Off Machines—MACHINE TOOLS

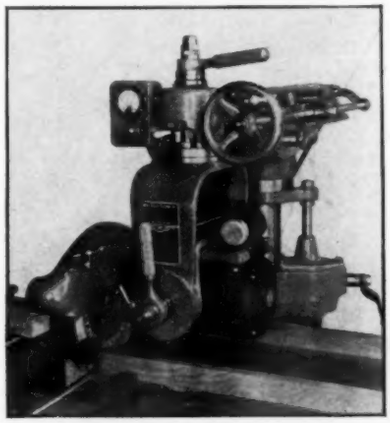


BROACHING MACHINE—*American Broach & Machine Co., Div. of Sundstrand Machine Tool Co., Ann Arbor, Mich.* Model 4HC-18 special broaching machine finish broaches half-round slots in differential cases of various sizes. Machine has four stations with two fixtures at each station. Permanent tooling set-up is made possible with two fixture stations on each side. Base contains oil and coolant reservoirs and all hydraulic equipment. Specifications: normal capacity, 4 tons, each cylinder; broaching speed, 18 ft. per min.; return speed, 28 ft. per min.; stroke, 18 in. Vol. 84, p. 730.

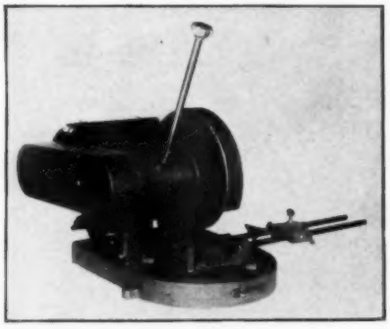


ABRASIVE CUTTER—*American Instrument Co., 8010–8020 Georgia Ave., Silver Spring, Md.* This abrasive cutting-off machine cuts metals, glass, quartz, ceramics and other materials in sheet, rod, tube and block form. Cuts up to 3½ in. can be made on materials with flat surfaces. A 12-in. rubber-bonded abrasive wheel 0.04 to 0.06 in. thick is used. Vol. 84, p. 72.

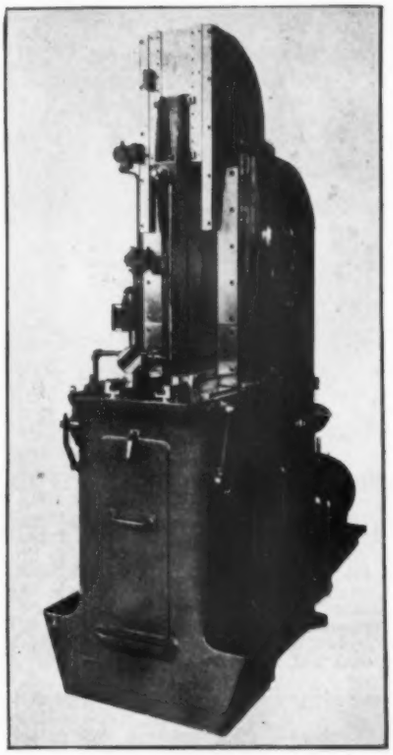




UNIVERSAL SAW — *Walker-Turner Co., Plainfield, N. J.* Steel saws or abrasive disks may be used in this universal radial saw. Blade is mounted on the shaft of a geared motor. Gears are protected by a shock-absorbing device. Motors are available in four sizes: 1, 1½, 2 and 3 hp. Circuit breaker gives added protection. Vol. 84, p. 108.

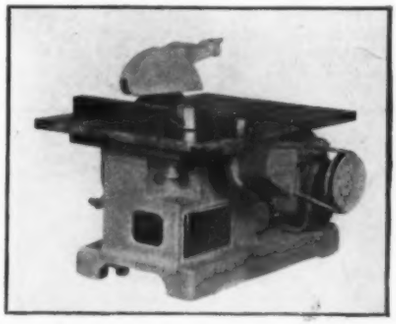


ABRASIVE CUTTER—*Catskill Metal Works, Inc., Catskill, N. Y.* Hard metals, plastics and ceramics can be cut with this Model D dry abrasive cut-off machine. Spindle frame has adjustable two-way stop to regulate depth of cut. Swivel V-block vise allows cuts from 90 to 45 deg. angles. Cutting gage is adjustable from 0 to 18 in. A 10-in. wheel is used. Vol. 84, p. 989.



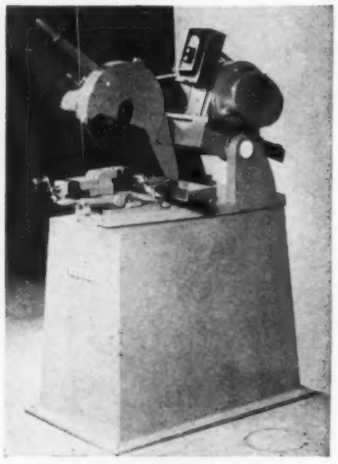
BROACHING MACHINE—*American Broach & Machine Co., Div. of Sundstrand Machine Tool Co., Ann Arbor, Mich.* Model T-24 three-way broaching machine is improved by addition of hydraulically operated broach retrieving mechanism, mounted above machine column, having its own slide and cylinder, timed to operate in proper relation to main cylinder. Once the machine is loaded and the cycle started, operation is automatic. Vol. 84, p. 733.

BROACHING MACHINE—*American Broach & Machine Co., Div. of Sundstrand Machine Tool Co., Ann Arbor, Mich.* No. 2 "Gearbroacher" for broaching external teeth of spur gears is claimed to achieve greater accuracy and higher production. It broaches every tooth at a single stroke, and allows for individual sharpening and adjustment of each broach, which cuts only a single tooth space. It is arranged for broaching two gears at a time, and is made in capacities of 8, 12 and 16 tons. Vol. 84, p. 734.

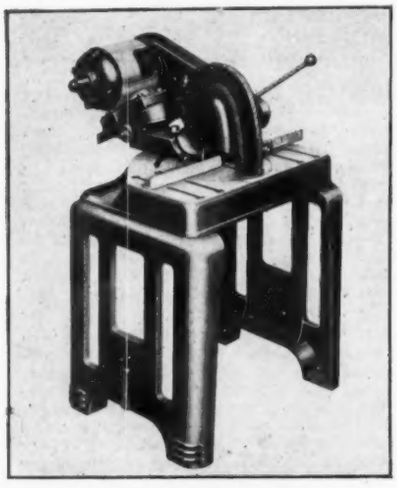


ABRASIVE CUTTER—*Crescent Machine Co., 9 Cherry Fork Ave., Lectonia, Ohio.* This portable abrasive cutting machine handles sheets up to 3/32 in. thick. Machine is 18 in. long, 13 in. wide and 8 in. high. The 8-in. abrasive wheel projects 1¾ in. above the table for cutting tubing 1½ in. in diameter. Speed is 3,500 r.p.m. Vol. 84, p. 522.

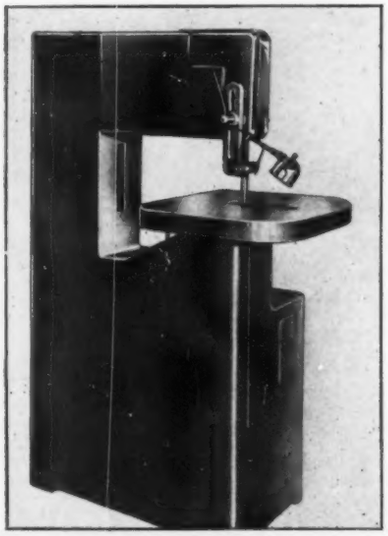
MACHINE TOOLS—Cut-Off and Filing Machines

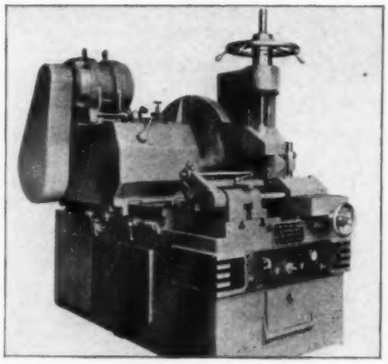


ABRASIVE CUTTERS—*A. P. de Sanno & Son, Inc., Phoenixville, Pa.* New Type M machine, for dry-cutting only, is of the heavy-duty bench type, and uses a 12-in. diameter disk $\frac{1}{16}$, $\frac{3}{32}$ or $\frac{1}{8}$ in. thick, driven from a 5-hp. motor through multiple V-belts. Old Type J machine has been improved to use an 18-in. disk in place of a 16-in. disk, and a 10-hp. motor replaces the 7½-hp. motor. Vol. 84, p. 805.

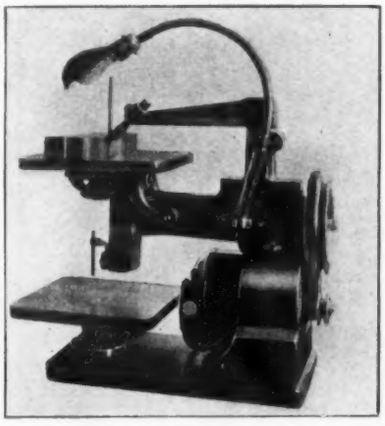


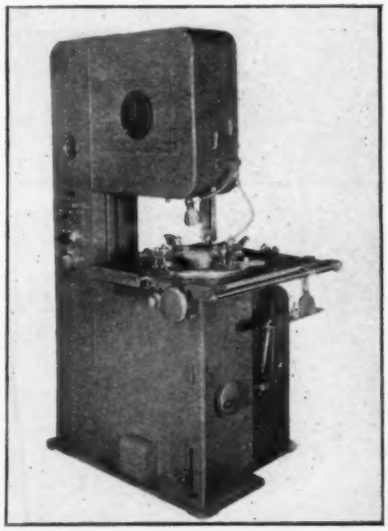
ABRASIVE CUTTER—*Delta Mfg. Co., 620 E. Vienna Ave., Milwaukee, Wis.* This improved abrasive cut-off machine cuts steel, brass, copper, cast iron, monel metal, plastics, pipe, wire rope, fibrous material, porcelain and hard rubber. By switching to a saw blade it will cut wood. Capacity is 2-in. diameters, or material up to 2x6 in. Vol. 84, p. 182.





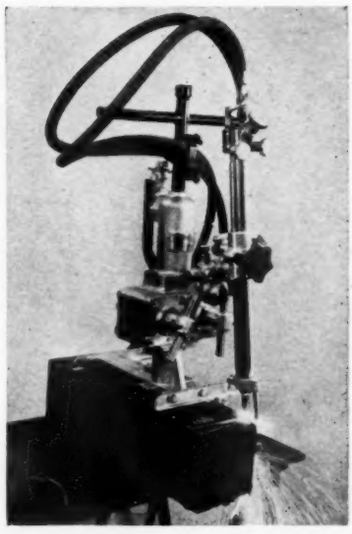
COLD SAWING MACHINE—*Motch & Merryweather Machinery Co., W. Third & Lakeside Ave., Cleveland, Ohio.* No. 3 hydraulic cold sawing machine has a rugged saw carriage, nine speed changes, hydraulic feed and automatic lubrication. Saw carriage contains entire drive to blade. Saw is controlled through clutch and brake operated from front of machine. Hydraulic feed provides stepless variable feed and quick return. Vol. 84, p. 732.





CONTOUR MACHINE—*Continental Machines, Inc., 1301 Washington Ave., S., Minneapolis, Minn.* "Super Doall" contour sawing machine incorporating a mechanical work feed accommodates saws up to 1 in. wide. In the cabinet base is the 1½-hp. motor. In the column, are the grinder and automatic butt welder. Vol. 84, p. 477.

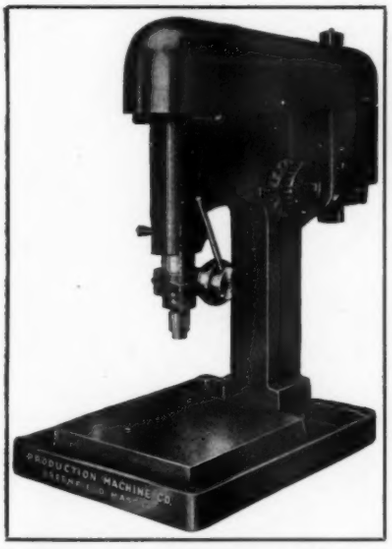
FILING MACHINE — *Grob Bros., Grafton, Wis.* Throat sizes of 18, 30, and 36 in. are available in these improved heavy-duty continuous filing machines. Speeds of 80, 120 and 160 ft. per min. are provided. Tiltable table measures 20x20 in. Vol. 84, p. 842.



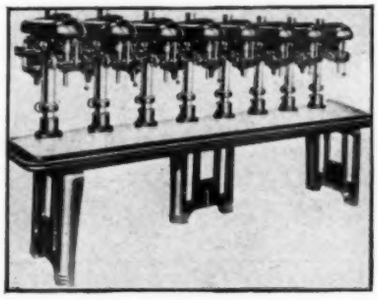
BAR CUTTER—*Union Carbide & Carbon Corp., 30 E. 42nd St., New York, N.Y.* "Oxweld" CM-35 oxy-acetylene bar-cutting machine will cut rounds or squares with minimum adjustment. It is driven by a self-contained spring-power unit, speed of which is hydraulically controlled between 1 and 75 in. per min. Guide track is not necessary. It has a cutting range of from 2 to 10 in., which can easily be increased to 8 to 15 by special links. Vol. 84, p. 800.

FILER—*Marburg Brothers, Inc., 90 West St., New York, N.Y.* This double-purpose machine finish files punches and dies. Among its features are (as a die filer) table which tilts to any compound angle, stroke fully adjustable from 0 to 1½ in., file fully supported over entire stroke, and (as a punch filer) table which tilts 10 deg. two ways, stroke fully adjustable to suit punch flange, automatic stopping of file. Vol. 84, p. 637.

BANDSAW—*Grob Bros., Grafton, Wis.* No. NS-18 toolroom bandsaw has a welded steel frame, 24x24-in. table tiltable four ways, and a built-in butt welder and grinder. Speeds range from 50 to over 2,000 ft. per min. Throat is 18 in. deep, and distance from table to upper column is 12 in. Machine will cut extra-heavy jobs, using saw blades up to 1 in. wide. A 1-hp. motor located in the base drives the machine through V-belts. Vol. 84, p. 591.



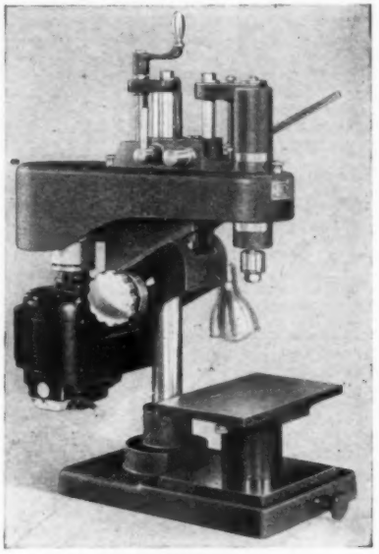
SENSITIVE DRILL—*Production Machine Co., Greenfield, Mass.* No. 25 high-speed sensitive bench drill, with variable speed drive using a ½-hp. motor, provides infinite spindle speeds from 2,000 to 10,000 r.p.m. Specifications: center of spindle to column, 7 in.; maximum distance from chuck nose to table, 6 3/16 in.; adjustment of sliding head, 3 in.; maximum spindle travel, 3¾ in.; drill sizes, No. 70 to ¼ in. Vol. 84, p. 684.



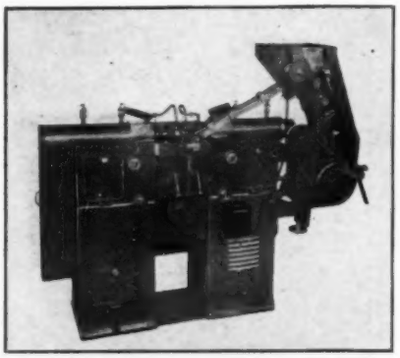
DRILL PRESS—*Delta Mfg. Co., 620 E. Vienna Ave., Milwaukee, Wis.* Each of these individual drill press table sections measures 22⅜ in. deep by 30 in. wide (with ends 35 in. wide) with room for two spindles, providing a minimum center-to-center distance of 15 in. Tables are accurately ground and fitted. Vol. 84, p. 1098.

SENSITIVE DRILL—*Langelier Mfg. Co., Providence, R. I.* No. 41 ball-bearing sensitive drill has extra large sealed bearings. Spindle mounting eliminates belt pull and makes feed very sensitive. Additional features include adjustable motor bracket, table and base with oil-retaining rims, and ball-bearing motor. Vol. 84, p. 848.

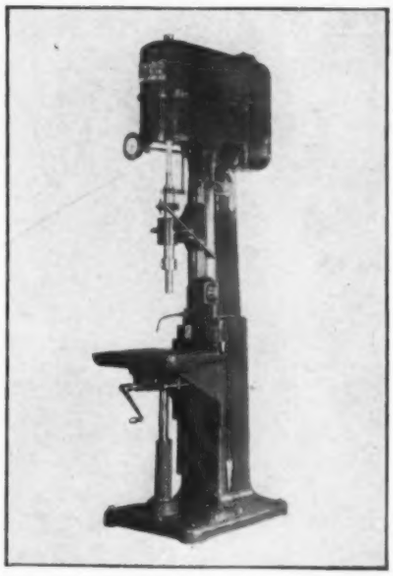
SENSITIVE DRILL—*Hamilton Tool Co., Hamilton, Ohio.* "Maxi-Varimatic" super sensitive drilling machine has speeds from 840 to 9,300 r.p.m., with a 1,725 r.p.m. motor. Vol. 84, p. 592.



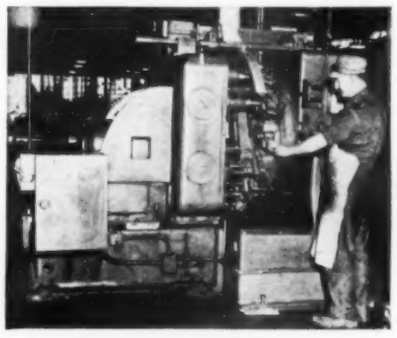
DRILL PRESSES—*Boice-Crane Co., 1730 Norwood Ave., Toledo, Ohio.* New models of "Helmet-Head" drill presses include single and multiple spindle floor types, Morse taper spindle types, and slow-speed models having five speeds from 425 to 3,340 r.p.m. in both single and multiple spindle bench and floor types. Vol. 84, p. 730.



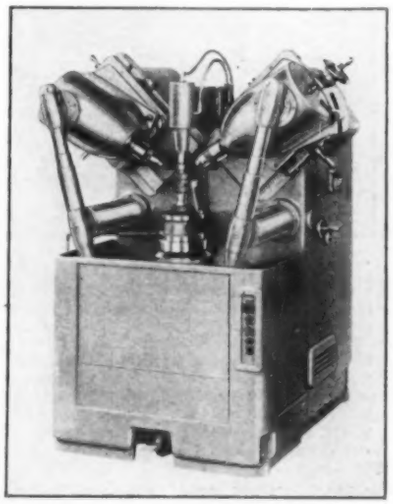
HORIZONTAL DRILL—*Kent Machine Co., Cuyahoga Falls, Ohio.* This horizontal duplex-spindle drilling machine is designed primarily for drilling cotter pin holes in screws, bolts, and similar parts, through either the head or shank. Machine can be furnished with either a semi-automatic or fully automatic work feeder. It has a 5/16-in. capacity. Vol. 84, p. 346.



DRILL PRESS—*Edmund Machinery Co., Cortland, N. Y.* Infinitely variable speed drive is incorporated in the No. 2-F drill. Speed is controlled from a dial at the front. Spindle speed range is 600–2,500 r.p.m. Vol. 84, p. 67.

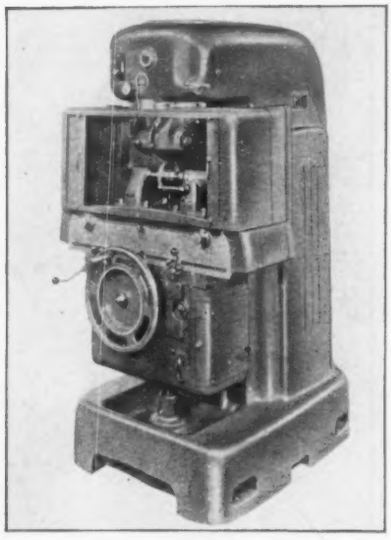


DRILLING MACHINE—*Greenlee Bros. & Co., 12th St. & Columbia Ave., Rockford, Ill.* This special unit for machining oil pump bodies consists of one-way horizontal multiple-spindle drilling and boring machine arranged with a twelve-position hand-indexing turret. Vol. 84, p. 149.

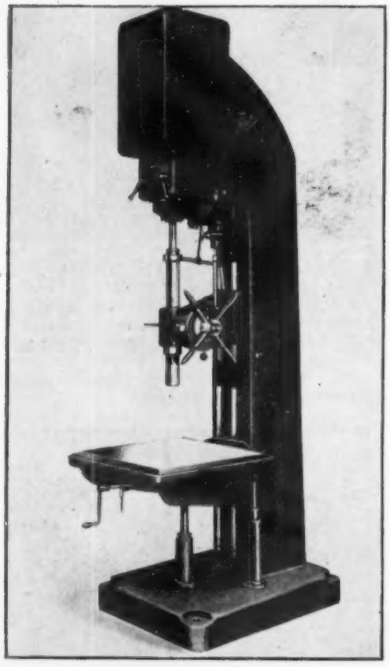


GEAR TOOTH POINTER—*Cross Gear & Machine Co., 3250 Bellevue Ave., Detroit, Mich.* Power rapid traverse automatically advances both cutters into operating position in the No. 62 helical gear tooth pointer. Specifications: gear diameter capacity, 10 in.; gear face capacity, 12 in.; gear pitch capacity, 4 pitch or finer; indexing range, 10–80 teeth. Vol. 84, p. 393.

MACHINE TOOLS—Drill Presses, Gear Cutters



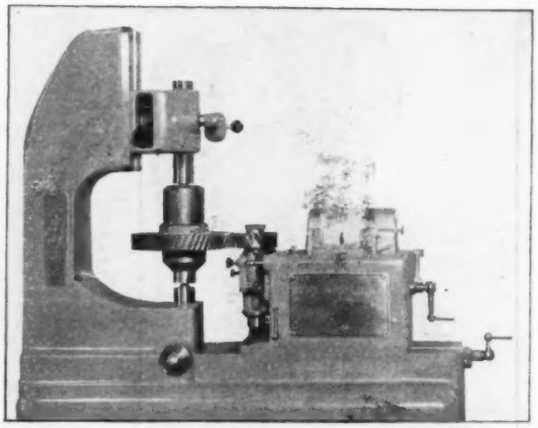
GEAR SHAVER—*National Broach & Machine Co., 11457 Shoemaker St., Detroit, Mich.* "Red Ring" gear shaving machine uses a gashed helical gear form tool in mesh with the work gear, with axes of work gear and cutter at an angle of 10 to 15 deg. Profile is corrected by generating action to within 0.001 in. Machine also provides for crowning teeth. Automatic feed box has been redesigned so that 0.001, 0.002, 0.003 or 0.004 in. feeds can be rapidly set. Vol. 84, p. 224.

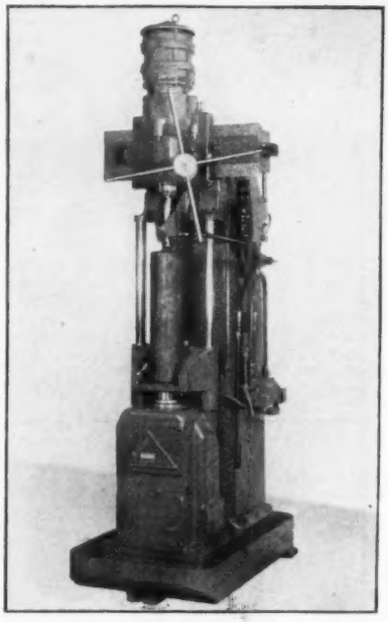


DRILL PRESS—*Buffalo Forge Co., Buffalo, N. Y.* No. 2 motor-spindle drill, powered with a 2-hp. motor, can be furnished with either 8 or 13 in. overhang, while the No. 3, powered with a 3-hp. motor, is built with 13 in. overhang only. Pedestal models are available having from one to six spindles. Machines can be furnished with or without back gears, power feed, and motor reverse for tapping. Vol. 84, p. 941.

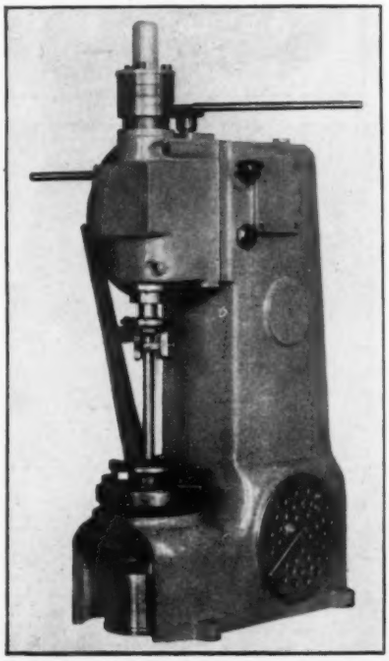
GEAR FINISHER—*Gear Processing, Inc., 6700 Grant Ave., Cleveland, Ohio.* Standing only 32 in. high, the bench model "Incolap" gear finishing and correcting machine handles gears rough and finish hobbed, shaped, or rough cut and shaved. Machine reciprocates gear and surrounding lap in relation to each other. Model illustrated will take gears from ¼ to 2 in. in diameter. Vol. 84, p. 593.

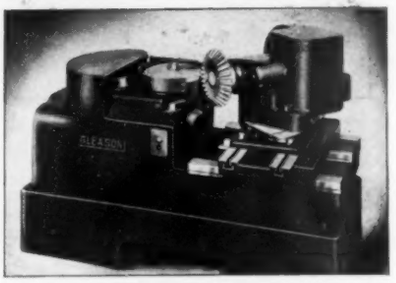
GEAR CHECKER—*Fellows Gear Shaper Co., Springfield, Vt.* No. 20M "Red Liner" gear checking machine handles gears on adjustable centers. Lower center presents the gear in correct relationship to the master gear, while the upper center handles gears on arbors of different lengths. Capable of checking both spur and helical gears up to 18 in. pitch diameter, this machine can also check internal gears. Vol. 84, p. 1040.



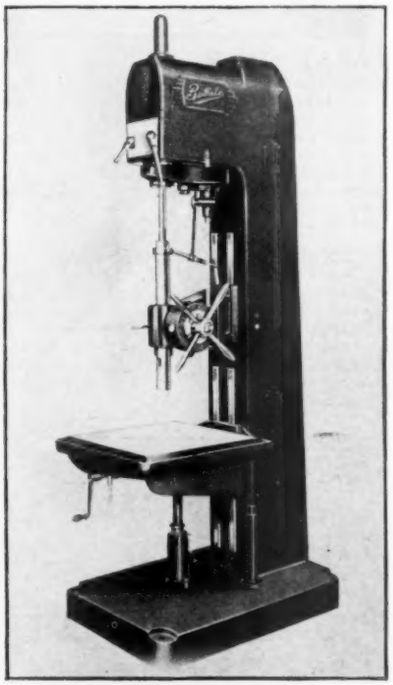


SHELL CENTERING MACHINE—*LeMaire Tool & Mfg. Co., 2657 S. Telegraph Rd., Dearborn, Mich.* This shell centering machine can be used for re-centering operations. An inverted spindle rotates the shell to keep the center concentric with the hole. All movements are by hydraulic power, except for manual center cutting. Vol. 84, p. 27.



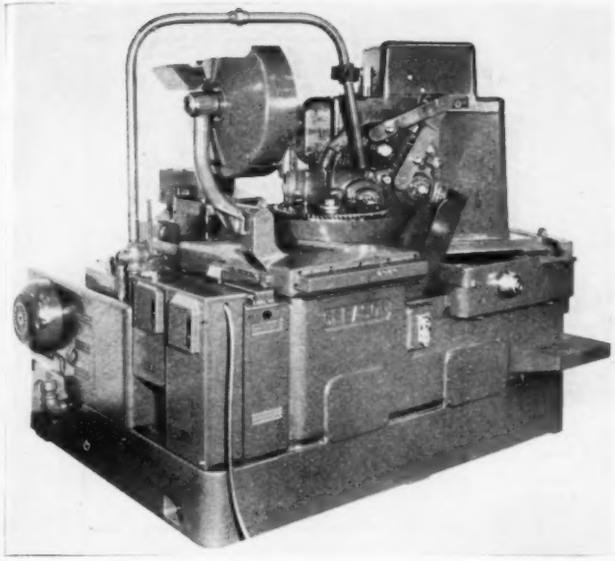


GEAR ROUGHER—*Gleason Works, Rochester, N. Y.* A new method of cutting to produce a correctly tapered tooth slot is employed in the No. 7 straight bevel gear rougher. This machine is suitable for roughing straight bevel gears up to 14 in. pitch diameter and 6:1 ratio in large or medium quantities. A single hydraulic control operates the workhead for changing blanks, including chucking and head movement and clamping. Indexing is controlled by change gears. Specifications: Maximum pitch diameter (6:1 ratio), 14 in.; coarsest pitch, 3 d.p.; greatest face length, 2 in. Vol. 84, p. 1037.

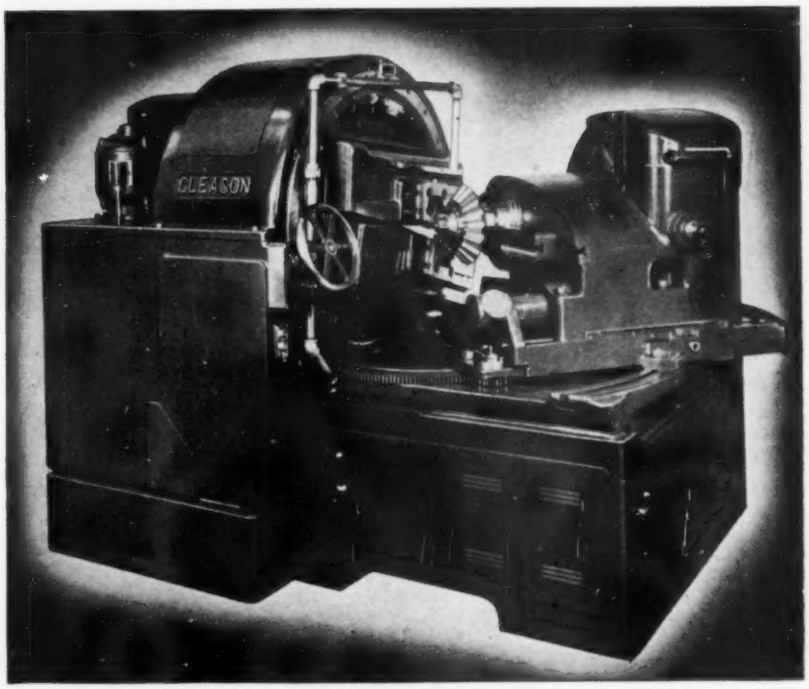


DRILL PRESS—*Buffalo Forge Co., Buffalo, N. Y.* Any of 100 spindle speeds can be selected with the motor running on the "RPMster" drill press. Two sizes, with capacities of 1½ and 1 in. in cast iron, are available. Both have an overhang of 13 in. Machines can be furnished with or without back gears and power feed. Vol. 84, p. 990.

Gear Cutters, Grinders—MACHINE TOOLS



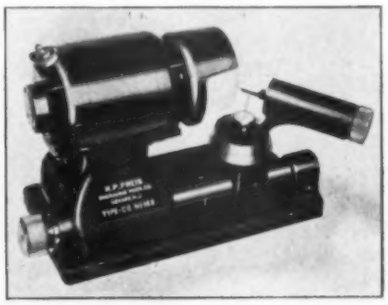
GEAR CUTTING MACHINE—*Gleason Works, 1000 University Ave., Rochester, N. Y.* "Revacycle" machine roughs and finishes straight bevel gears in one revolution of a single disk cutter. This cutter has radially arranged roughing blades followed by finishing blades with a gap between the last finishing and the first roughing blade. Except for chucking, operation is entirely automatic. Specifications: Maximum cone distance, 3 in.; maximum face, 1½ in.; pitch diameters, 2¾ to 5½ in.; index range, 8 to 50 teeth. Vol. 84, p. 683.



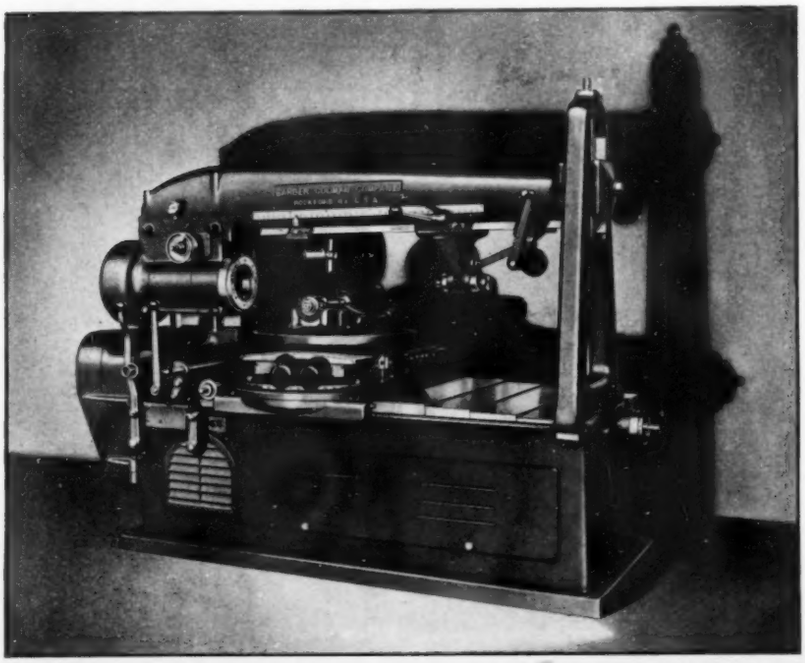
GEAR GENERATOR—*Gleason Works, Rochester, N. Y.* Smoother, quieter running straight bevel gears are cut up to 50 per cent faster with the No. 24 straight bevel gear generator. This machine will handle gears up to 35½ in. in diameter with pitches as coarse as 1½ D.P. Adjustments of feed and speed rates, index, ratio of roll, and amount of roll are obtained by change gears. Automatic lubrication is provided. Specifications: Maximum cone distance, 17¾ in.; maximum pitch angle, 84 deg. 18 min.; minimum pitch angle, 5 deg. 42 min.; ratios, 1:1 to 10:1; maximum face width, 6 in.; index range, 10 to 200 teeth. Vol. 84, p. 937.

GRINDER — *Hammond Machinery Builders, Inc., 1618 Douglas Ave., Kalamazoo, Mich.* Type WS wide swing grinder has 14-in. boiler plate guards. Distance between wheels is 36 in. Base measures 24x24 in.; weight is 915 lb. Vol. 84, p. 309.

DISK SANDER—*Max Mfg. Co., 735 The Alameda, San Jose, Calif.* This 16-in. universal disk sander surfaces wood, metal, plastics and other materials quickly and accurately. Working unit is mounted on top of a ground steel column which is pressed into a cast iron base. Table is 9½x18 in., can be set quickly at any angle from 45 deg. up to 45 deg. down. Vol. 84, p. 731.

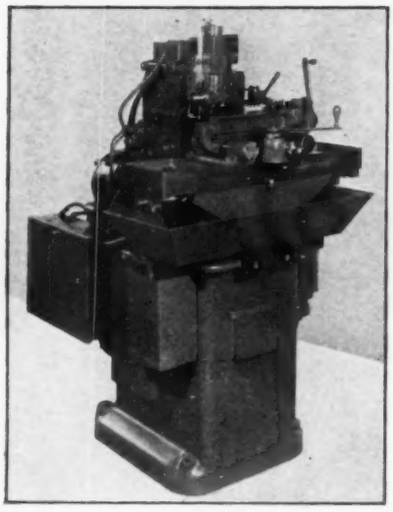


BENCH GRINDER—*H. P. Preis Engraving Machine Co., 157 Summit St., Newark, N. J.* "Panto" CG compact bench grinder accurately sharpens single-lip engraving and routing cutters. It handles tapered-shank and straight-shank cutters up to ¼ in. in diameter. Cup 2¼ in. in diameter is attached directly to the shaft of a totally inclosed ball bearing universal motor operating at 8,500 r.p.m. Vol. 84, p. 646.

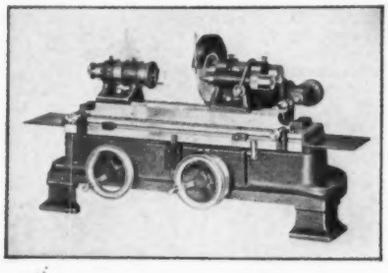


HOBBING MACHINE — *Barber-Colman Co., Rockford, Ill.* Type T machine can be used for standard hobbing of spur gears, spiral gears, straight splines, worms, worm wheels, and similar items. Hob swivel construction provides means to traverse hob longitudinally and laterally. Standard hobs up to 4 in. in diameter and 4 in. long can be used. Vol. 84, p. 1035.

MACHINE TOOLS—Grinders

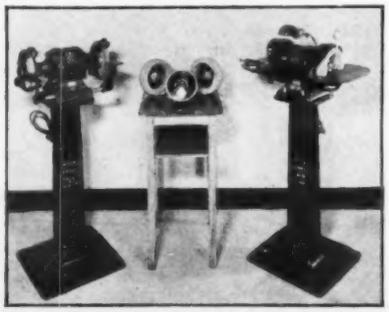


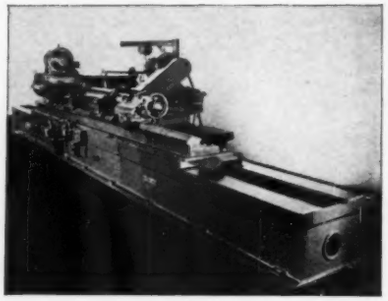
AUTOMATIC GRINDER—*Le Maire Tool & Mfg. Co., 2657 S. Telegraph Rd., Dearborn, Mich.* Developed especially for grinding channels in airplane engine connecting rods, this automatic grinder comprises a saddle and table actuated hydraulically and controlled by positive stops. Hydraulic actuation is coordinated with a high-speed grinding wheel head and carrier capable of generating a true radius at each end of the stroke. Dresser automatically redresses wheel to generated form. Spindle runs at 18,000 r.p.m. for a 1-in. wheel. Vol. 84, p. 65.



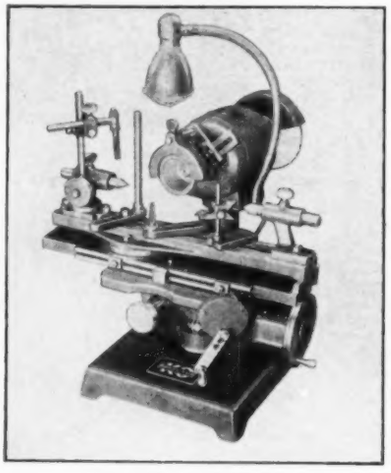
CYLINDRICAL GRINDER—*Crystal Lake Machine Works, Crystal Lake, Ill.* This bench-type plain cylindrical grinder has a micrometer stop on the wheelhead which can be set to 0.0001 in. direct on dial. Spindle speed is 3,200 r.p.m. Machine will take a 6-in. diameter $\frac{1}{8}$ to $\frac{5}{8}$ in. face wheel. Workhead has $\frac{1}{2}$ in. collect capacity. Vol. 84, p. 112.

TOOL GRINDER—*Thomas Prosser & Son, 120 Wall St., New York, N. Y.* A complete set-up for grinding cemented carbides, Stellite, or high-speed steel single-point tools consists of a high-power grinder having a coarse straight vitrified wheel on one end for hogging down shank steel, and a rough open-grain straight silicon carbide wheel for rapidly roughing down chipped or badly worn carbide tools. Table grinder permits a comparatively small amount of grinding on the surface of the silicon carbide cup wheel, with a final touching up on the finishing wheel. Motors for both grinders are reversible so that either left or hight-hand tools can be ground. Vol. 83, p. 310.



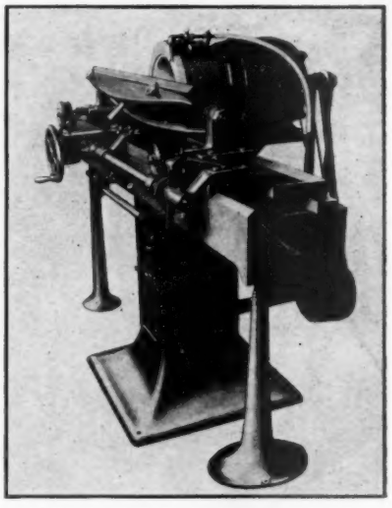


CYLINDRICAL GRINDER—*Farrel-Birmingham Co., Ansonia, Conn.* Type TT cylindrical grinder incorporates a traveling work table and a fixed grinding wheel unit. It is equipped with a sensitive reversing mechanism which permits grinding up to a shaft shoulder. Table traverse and reversal are automatic. Table is driven by an adjustable speed reversing motor through a two-speed drive. Vol. 84, p. 27.

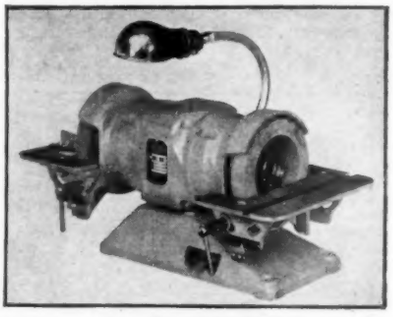


CUTTER GRINDER—*K. O. Lee & Son Co., Aberdeen, S. D.* "Knock-Out" Model A-270 tool and cutter grinder is a complete tool sharpening machine. It will swing 5 in. over table, 16 in. between centers. Longitudinal feed is 11 in. and cross feed is 3½ in. Vertical feed is 6½ in. The ¼ hp. 3,450 r.p.m. motor is mounted on a swivel head. A 6-in. wheel can be used on top of a 5-in. cutter. Vol. 84, p. 31.

CUTTER GRINDER—*Oliver Instrument Co., Adrian, Mich.* This improved grinder can be used for all types of milling cutters and reamers with a minimum number of attachments. Adjustable wheelhead is equipped with Timken bearings. Face mills up to 14 in. diameter can be ground at one cutter setting. Vol. 84, p. 106.

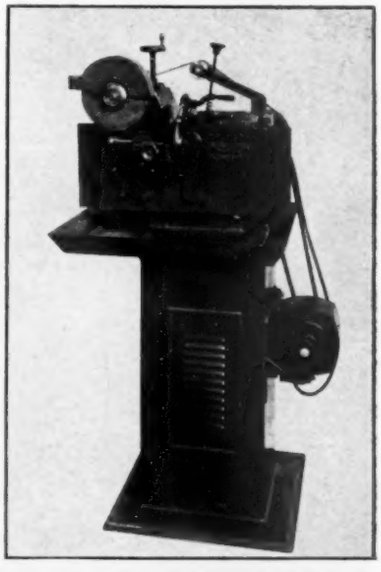


KNIFE GRINDER—*Samuel C. Rogers & Co., 191 Dutton Ave., Buffalo, N. Y.* Improved Type B automatic knife grinder is made in five sizes to accommodate knives from 26 to 34 in. long. It grinds knives edge up or down. It is equipped with a 1½-hp. motor and a 10-in. grinding wheel. Vol. 84, p. 349.

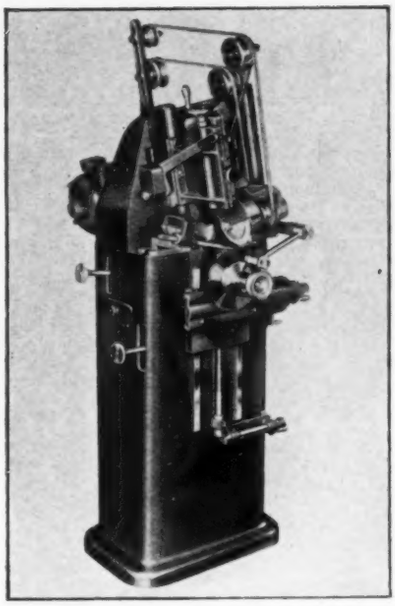


TOOL GRINDER—*Baldor Electric Co., 4351–59 Duncan Ave., St. Louis, Mo.* This improved carbide tool grinder operates with minimum vibration, as it has a heavier, shorter shaft. It is driven by a ½-hp., 3,400-r.p.m. ball bearing reversible motor. Vol. 84, p. 108.

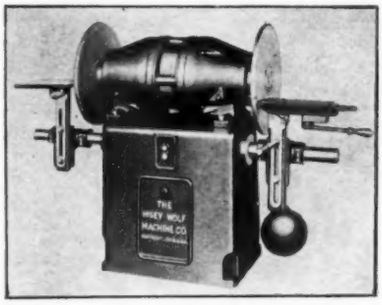
SAW GRINDER—*Wardwell Mfg. Co., 3167 Fulton Rd., Cleveland, Ohio.* No. 57T automatic metal saw grinder is designed especially for sharpening form milling cutters, slitting and screw slotting saws in gangs in one setting. Machine automatically indexes the gang, and is claimed capable of sharpening a gang with a variation of plus or minus 0.001 in. of exact diameter for the entire lot. A group of 250 saws 0.015 in. thick can be sharpened at once. It handles work 8 in. in diameter with tooth spacing up to 1¼ in. Vol. 84, p. 1098.



Grinders—MACHINE TOOLS

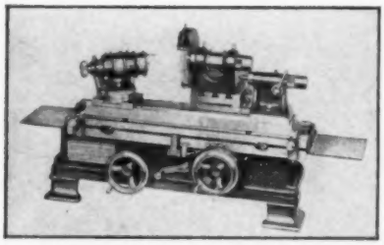


SAW GRINDER—*Covel-Hanchett Co., Big Rapids, Mich.* No. 11-30 metal saw sharpener simplifies grinding of high-efficiency saw blades used on hydraulic cold sawing machines. Cams permit teeth of proper shape to be ground automatically. Vol. 84, p. 440.

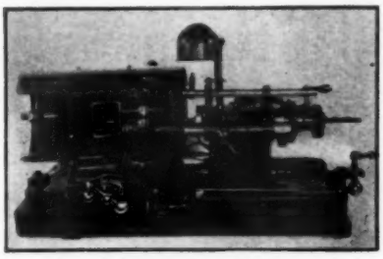


DISK GRINDER — *Hiscy-Wolf Machine Co., Cincinnati, Ohio.* These direct drive disk grinders have extra heavy end bells with feet which carry the bearing directly behind the disk, improved bearing construction, and better lubrication. Machine is made in sizes from 3 to 10 hp. Vol. 84, p. 781.

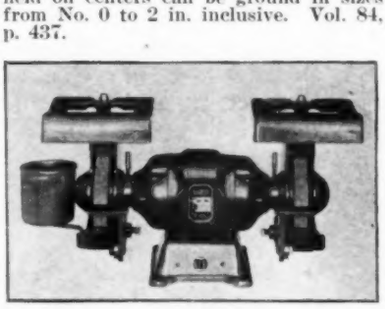
SURFACE GRINDER—*Builders Iron Foundry, 9 Codding St., Providence, R.I.* Model T surface grinder features a table which rests on the plane ground bed surface and is guided longitudinally and laterally by T-square control. Driving motor holds spindle housing against micrometer adjusting screw, eliminating backlash. Magnetic chuck measuring 8x4 in. or mechanical fixture can be furnished. A ¼-hp. motor is used. Grinder will take work 8 in. long, 4 in. wide and 10 in. high under a 7-in. wheel. Vol. 84, p. 394.



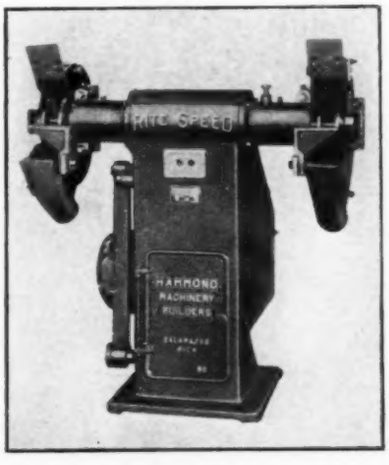
BENCH GRINDER—*Crystal Lake Machine Works, Crystal Lake, Ill.* The "Universal" bench grinder for production, tool and experimental work is fully adjustable. Collet capacity of the headstock is ½ in. Four changes of work speed are provided. Vol. 84, p. 29.

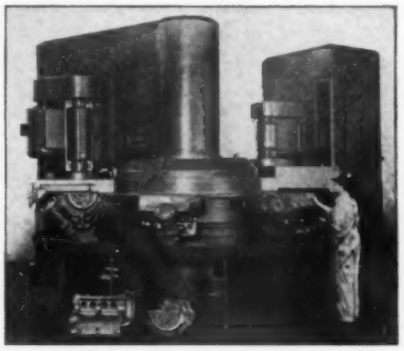


TAP GRINDER—*Edward Blake Co., 53 Marshall St., Newton Center, Mass.* "JB" tap grinder sharpens two, three, four, and five fluted taps uniformly on the chamfer. It will sharpen right- or left-hand taps and will grind any taper or angle of chamfer. Relief can be set accurately and quickly changed. Taps of any length held on the outside diameter of thread can be sharpened in sizes from No. 0 to ½ in. inclusive. When held on shanks, taps of any lengths ranging from No. 0 to ¾ in. diameter can be ground. Taps up to 5 in. long held on centers can be ground in sizes from No. 0 to 2 in. inclusive. Vol. 84, p. 437.

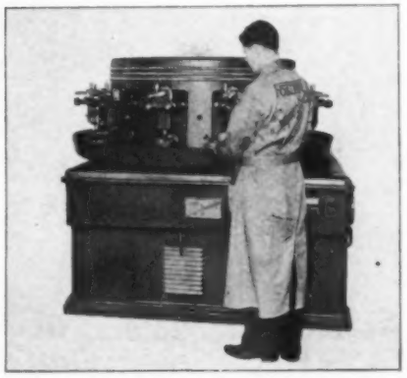


GRINDER—*Baldor Electric Co., 4351 Duncan Ave., St. Louis, Mo.* Outstanding features of this deluxe grinder are shatter-proof glass eyeshields which throw light on either side of and in front of the wheel. Identified is the No. 724 grinder, this 7-in. model is powered with a ½-hp., 3400-r.p.m. motor, and is equipped with 7x1-in. "Aloxide" wheels. Vol. 84, p. 690.





SNAGGER GRINDER—*Gardner Machine Co., 410 E. Gardner St., Beloit, Wis.* Weighing over 34 tons, the No. 219 four-head cylinder block snagging grinder has a capacity of five V-8 cylinder blocks per minute. It grinds bottom and both ends of blocks at one setting. Four grinding heads are used, each pair supported by a massive column. Rotary work carrier is provided with six stations. Vol. 84, p. 479.

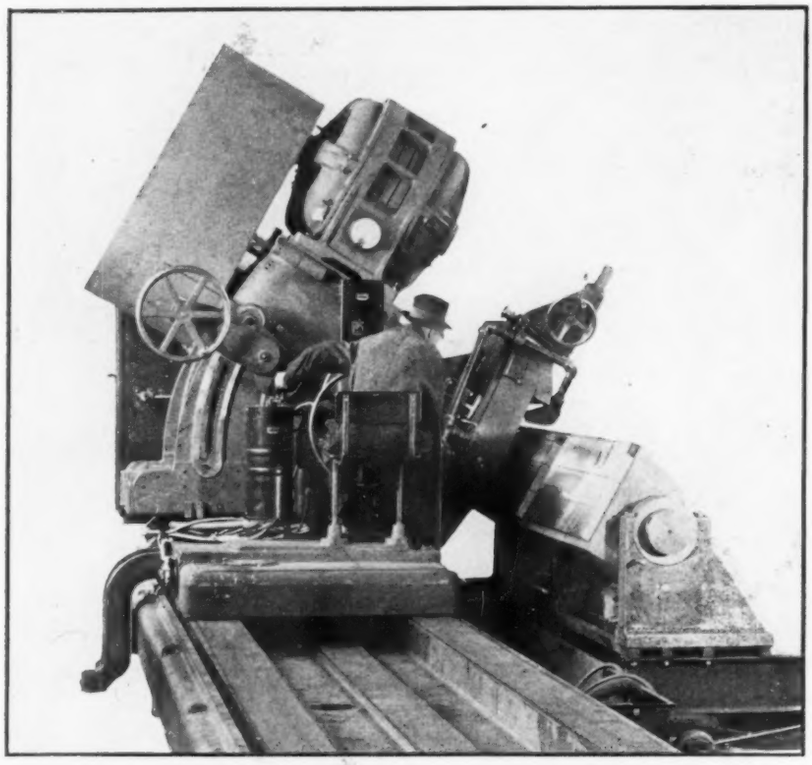


SUPERFINISHER — *Foster Machine Co., Elkhart, Ind.* Arranged to superfinish valve tappet bodies, this twelve-spindle continuous type Superfinisher has a fully automatic cycle. Each work spindle is equipped with a centerless drive, wherein the tappet body is rotated by rolls. Spindle speeds and table speeds can be changed quickly. Machine can be arranged with collets for holding other types of parts. Vol. 84, p. 106.

HYDRAULIC UNIVERSAL GRINDER —*Cincinnati Grinders, Inc., Cincinnati, Ohio.* This hydraulic universal grinder features a mechanical speed changing device, eliminating variable-speed d.c. motors. Standard a.c. motors can be used. An infinite number of work speeds may be obtained, varying from 55 to 500 r.p.m. Grinder has a swing of 12 in. and can be obtained in between-center lengths of 24, 36, 48 and 72 in. Table feed is actuated hydraulically. "Filmatic" spindle bearings are used. Vol. 84, p. 105.

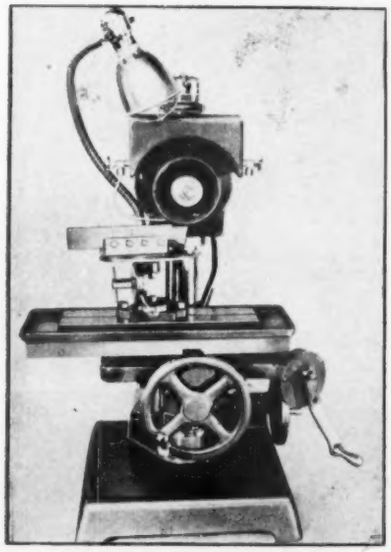
WIDE-SWING GRINDER—*Hammond Machinery Builders, Inc., 1618 Douglas Ave., Kalamazoo, Mich.* "Rite-Speed" multiple V-belt driven wide-swing grinder is a four-bearing machine with totally inclosed fan-cooled motor. It is recommended for grinding bulky castings. Distance between wheels, 35 in.; motor sizes, 3, 5 or 7½ hp. Vol. 84, p. 477.

MACHINE TOOLS—Grinders



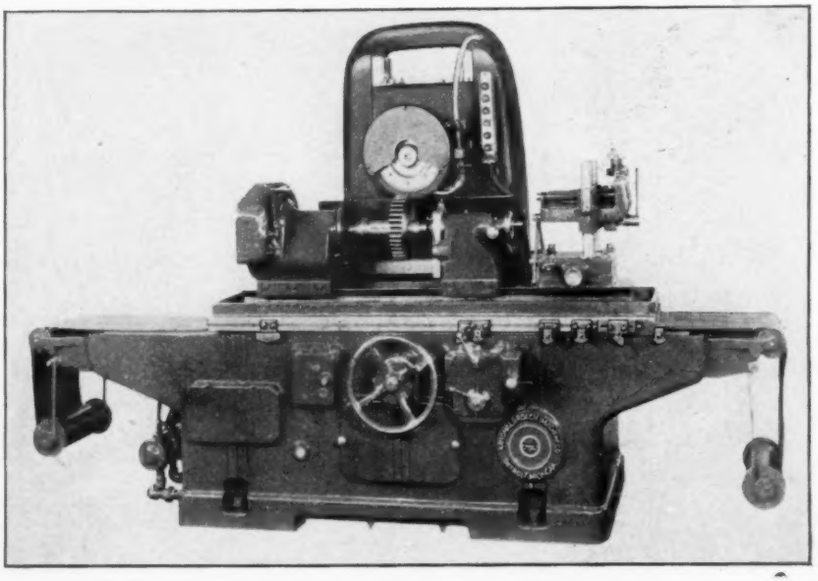
FACE GRINDER—*Hanchett Mfg. Co., Big Rapids, Mich.* No. 700 traveling wheel face grinder is built specially for finishing edges of armor plate, having a capacity for grinding plates 10 ft. wide, 45 ft. long, and up to 20 in. thick. Wheel is of the segmental type, 48 in. in diameter. Each abrasive block has a 4x8-in. grinding face. Spindle, 8 in. in diameter, is mounted on Timken bearings, and is driven through V-belts from a 125-hp. motor. Wheelhead has hand, power and automatic cross feed, and can be adjusted from the vertical to an angle of 30 deg. Carriage feed mechanism is driven through a 15-hp. reversing motor with variable speeds. Grinding is done wet. Vol. 84, p. 637.

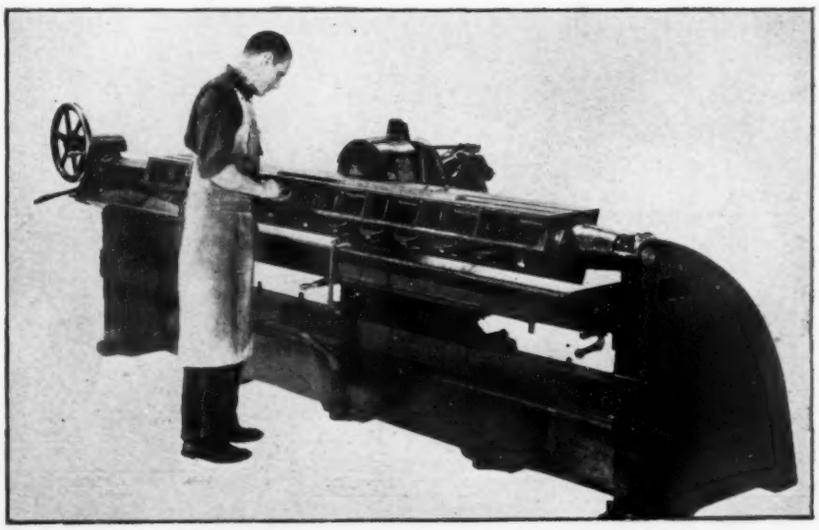
GEAR AND BROACH GRINDER—*National Broach & Machine Co., 11457 Shoemaker St., Detroit, Mich.* Increased production of quality gears is claimed for the "Red Ring" gear grinding machine. Utilizing a U-column, the machine is exceptionally rigid, with wheel spindle mounted on long bearings. Spindle is integral with motor rotor, and spindle slide is adjustable vertically by a handwheel. Table slide is hydraulically reciprocated and automatically controlled through a feed box on the front of the machine. Combination flat and V ways are provided with automatic force-feed lubrication. Index head is furnished with either fully automatic or semiautomatic control. For gear tooth work a templet control trimmer is provided which trims both sides of the wheel simultaneously. Vol. 84, p. 775.



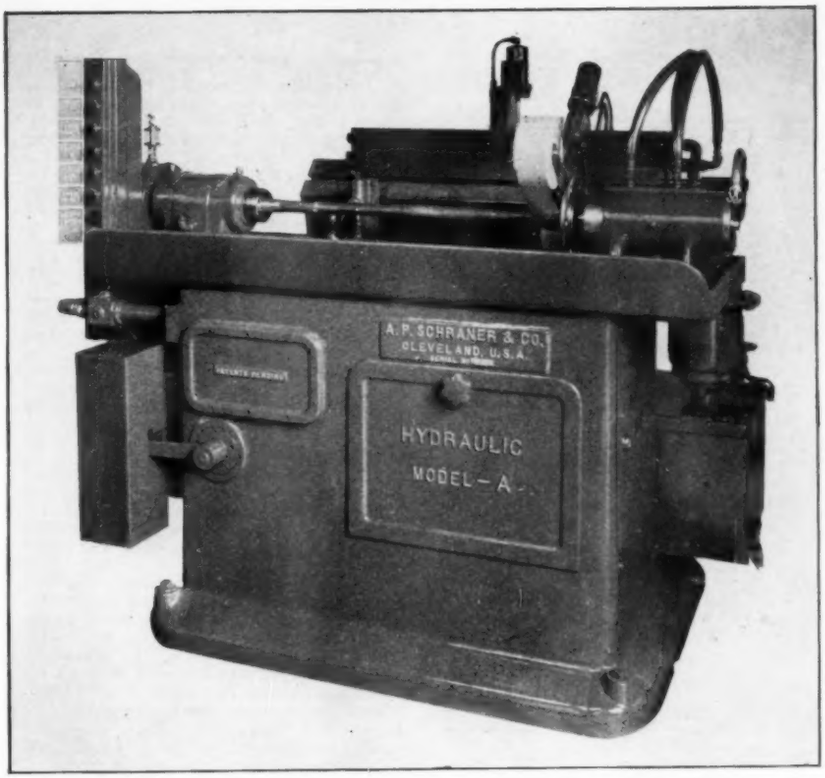
TOOL GRINDER — *Carboloy Co., 11149 E. Eight Mile Rd., Detroit, Mich.* With this grinder, exact forms of chip-breakers can be duplicated quickly when the tool is re-ground. Tool is clamped in a holder mounted on a universally adjustable fixture table fitted with three protractors, to permit adjusting to correct setting in all directions. Grinder is designed for use with tools up to 1¼ in. wide. Operation is through a 110 volt, 60 cycle, ¼-hp. ball-bearing motor equipped with reversing switch. Vol. 84, p. 893.

KNIFE GRINDER—*Scybold Div., Harris-Scybold-Potter Co., Dayton, Ohio.* This high-speed precision grinder is capable of sharpening almost all straight knives in general use. Having an automatic wheel feed and cooling system, it removes minimum metal, quickly producing a keen cutting edge which requires little honing. Machine does not require an experienced operator, and grinds equally well shear blades or beveled knives. Unique feature is a hollow three-sided knife bar, each surface of which presents a different series of angles to the traveling wheel. Machine is made in three sizes: 70 in., 100 in. and 128 in. Vol. 84, p. 592.



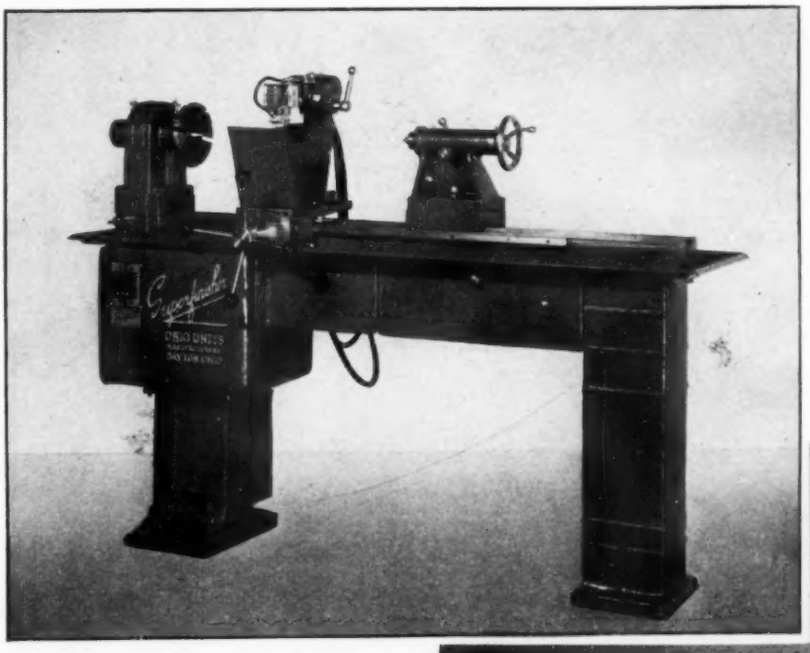


MACHINE TOOLS

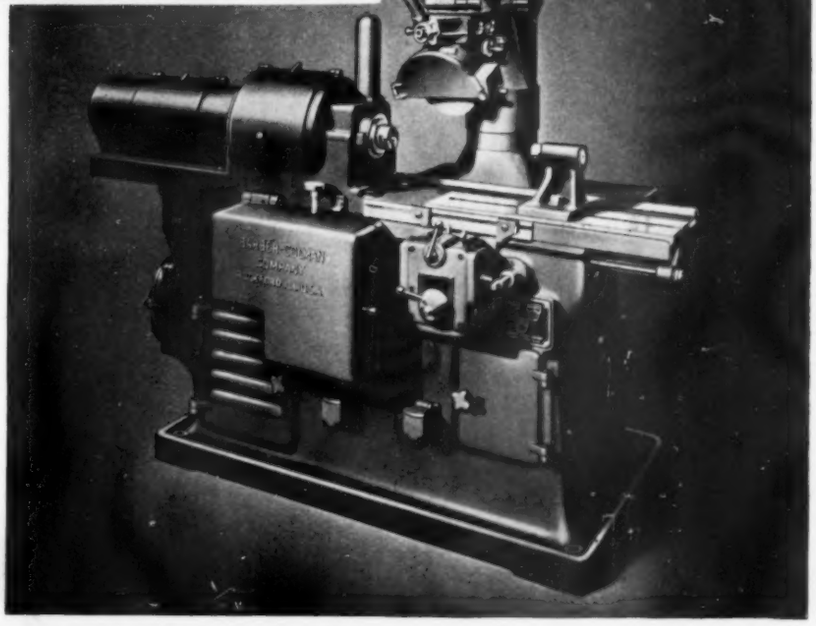


CYLINDRICAL LAPPING MACHINE—*A. P. Schraner & Co., Payne Ave. & E. 33rd St., Cleveland, Ohio.* An improved design Model A lapping machine, incorporating simple and convenient adjustments to permit quick changeover, is suitable for lapping external cylindrical surfaces on straight shafts, crankshafts, and plain bearings. Heads are adjustable laterally and are arranged to take interchangeable lapping shoes for various sizes of work. Machine is fully hydraulic, with solenoid operated clutch and valves, equipped with pushbutton control. Production of from 150 to 250 pieces per hour can be obtained. Finish obtainable is of the order of 2 to 3 micro-inches. Vol. 84, p. 729.

DISK GRINDER—*Hanchett Mfg. Co., Big Rapids, Mich.* No. 153 vertical spindle disk grinder employs a disk 1 in. thick, made up in eight sections. Spindle is mounted in preloaded precision ball bearings and is driven through V-belts by a 25-hp. motor. Spindle speed is 435 r.p.m. Machine can be arranged for wet grinding. An oscillating wheel dresser is built into the machine. Vol. 84, p. 729.

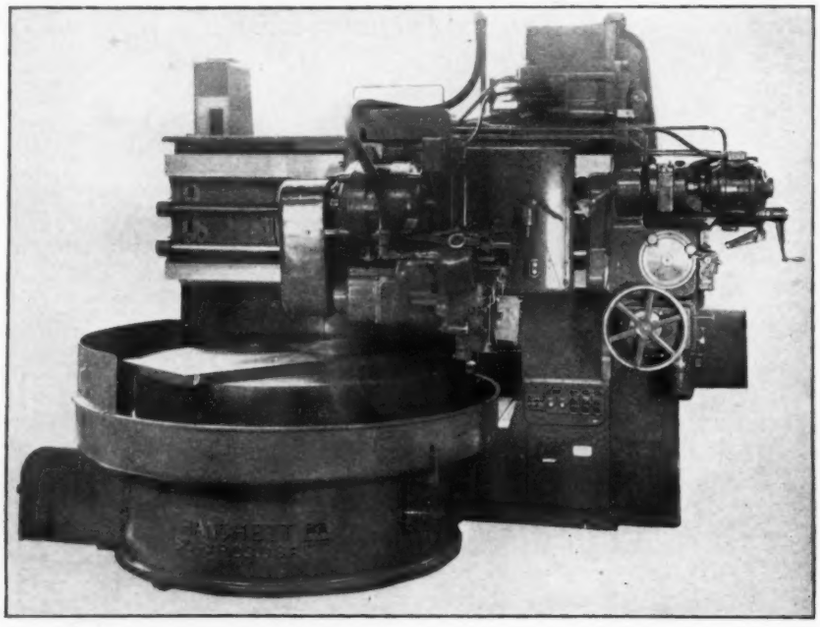


SUPERFINISHING MACHINE—*Ohio Units, 515–531 Hunter Ave., Dayton, Ohio.* This general-purpose superfinisher is suitable for toolrooms, experimental departments and for small production runs. Round and flat, external and internal surfaces can be superfinished. No. N-301 universal model shown has an oscillating head carrying the superfinishing stones. This head is mounted on a carriage which may be manually traversed. Head may be adjusted quickly to any position, and is driven by a flexible shaft from the main motor. Capacity of this machine is 14 in. swing over the bed with 11⅞ in. swing over the carriage. Length between centers is 14 in. Vol. 84, p. 517.



CUTTER GRINDER—*Barber-Colman Co., Rockford, Ill.* Hobs and formed milling cutters in sizes up to 10 in. diameter and 12 in. face can be automatically reground to precision limits in the improved No. 4 hob sharpening machine. Spiral wheel dresser enables operator to grind true radial faces on high-helix hobs or formed cutters. A straight-line wheel dresser is built into the wheel guard. Vol. 84, p. 221.

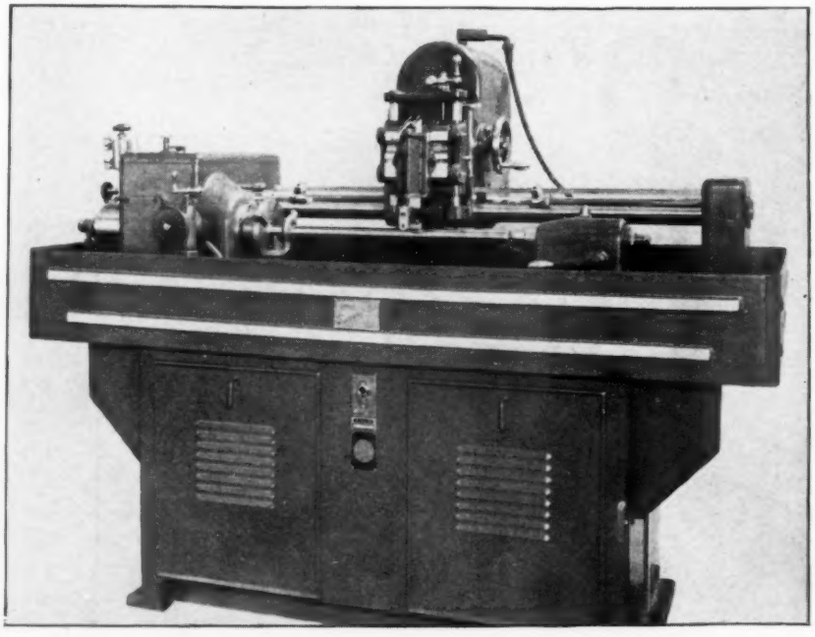
MACHINE TOOLS—Grinders



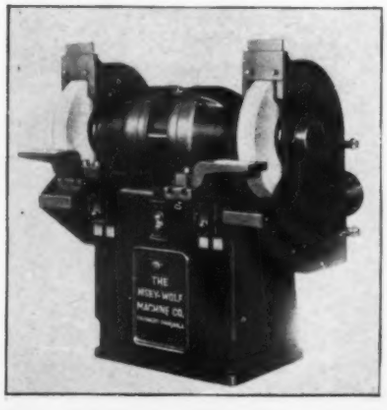
SURFACE GRINDER—*Hanchett Mfg. Co., Big Rapids, Mich.* Provision for either a horizontal or vertical spindle is one of the features of the "Rotary Plano" surface grinder. Horizontal spindle will accommodate a straight wheel, while the vertical spindle can be fitted with either a cylindrical or segmental wheel. In any combination the wheelhead can be fed automatically or by hand in increments of 0.0002 to 0.0030 in. Wheel driven by a 30-hp., 1,200-r.p.m. motor, is mounted on a cross rail between two columns. Wheelhead has adjustable cross feed with speed range from 3 to 9 in. per min. The 72- or 84-in. table is driven by a 15-hp. motor through a variable-speed unit, which gives table speed from 6 to 18 r.p.m. It swings work up to 90 in. in diam. Machine illustrated has a 24-in. wheel. Vol. 84, p. 841.

SUPERFINISHING MACHINE—*Foster Machine Co., Elkhart, Ind.* The 4x36 in. Superfinisher is designed for work larger than can be accommodated on the general purpose Superfinishers previously announced. It is claimed to be ideal for the larger sizes of guide bars for die sets, piloted boring bars, and almost any cylindrical work up to 4 in. in diameter and 36 in. in length. Machine can also be built to accommodate work approximately 50 in. between centers. Spindle is driven by a Graham transmission with speeds from 0 to 500 r.p.m. Vol. 84, p. 842.

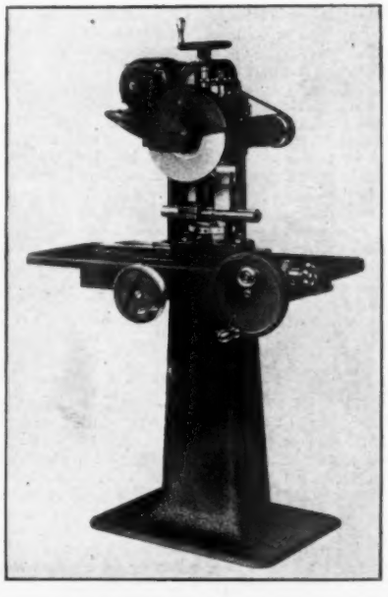
TOOL GRINDER—*Thos. Prosser & Son, 120 Wall St., New York, N.Y.* As a companion to the Model AA machine, this heavy duty carbide tool grinder embodies all features of the smaller machine, plus ample power for grinding the heaviest tools. It also incorporates provision for wet grinding. Grinder is equipped with quick-acting indexing tables. Spindle runs in double-row, self-aligning, precision ball bearings, with labyrinth dust seal, driven by double V-belts. Vol. 84, p. 991.

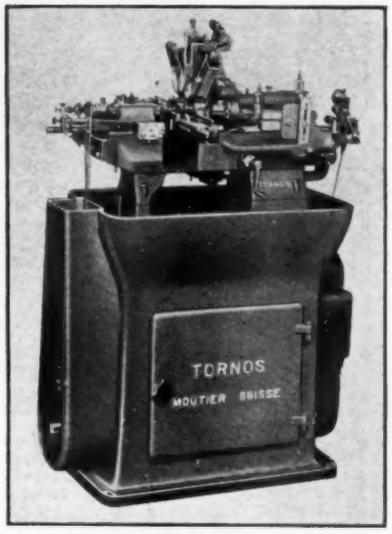


CHASER GRINDER—*Geometric Tool Co., New Haven, Conn.* To meet the demand for smooth, accurate threads in tough materials, No. 20 machine is built for the single purpose of accurately and economically resharpening die head and tap chasers. Machine work table is mounted directly on a plane ground surface, and may be manually fed both longitudinally and transversely. A rapid feed is provided, while fine adjustments are possible by means of a micrometer handwheel. Specifications: table travel, 8 in. longitudinal, 3¾ in. transverse; table working surface, 4x19 in.; distance from spindle center to table top, 13¼ in. maximum, 2½ in. minimum. Vol. 84, p. 844.

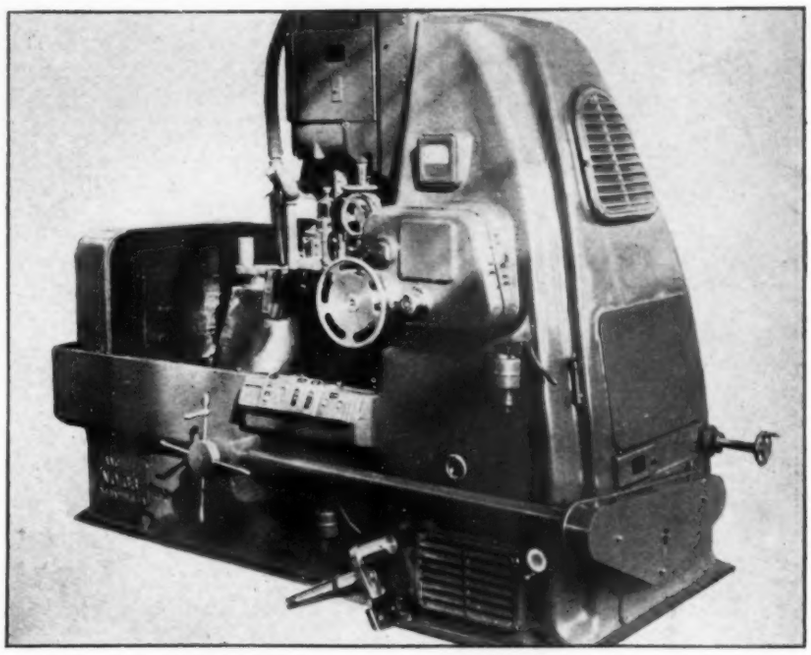


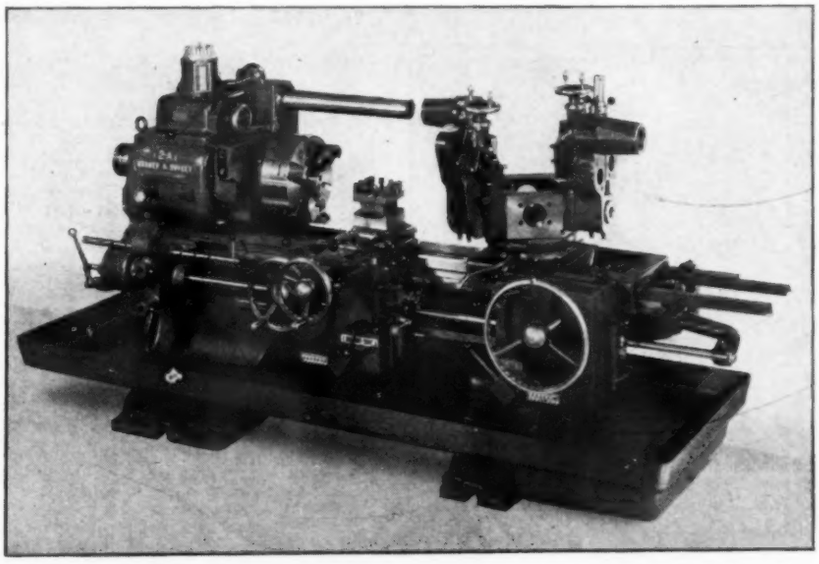
PEDESTAL GRINDER—*Hisey-Wolf Machine Co., Cincinnati, Ohio.* A 5-7½-hp. pedestal grinder can be supplied with new guards designed in accordance with standards adopted by the American Foundrymen's Association. Machines are built in 18- and 20-in. wheel sizes, with motor totally inclosed and ventilated through the pedestal. It is claimed that it is impossible for work to jam between wheel and guard. Flange on outlet makes connection to a dust collecting system. Vol. 84, p. 938.





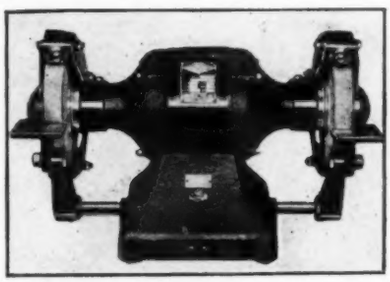
SCREW MACHINES—*George Scherr Co., 128 Lafayette St., New York, N.Y.* Improved automatic screw machines comprise seven models with spindle bores to take bars to 1 $\frac{3}{16}$ in. in diameter. Headstock feeds longitudinally on bed. Five simple turning tools are arranged radially around the stock. Tools move by cam action. Spindle turns up to 12,000 r.p.m. Vol. 84, p. 69.

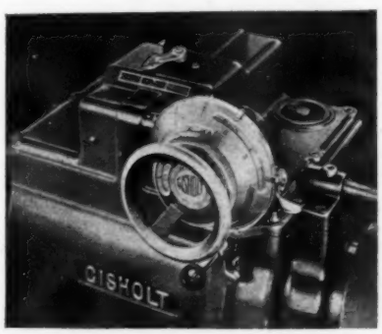




SURFACE GRINDER—*Hanchett Mfg. Co., Big Rapids, Mich.* A special adaptation of the No. 36 rotary surface grinder finishes aircraft engine crankshafts. Machine is fitted with a Hanchett-designed fixture to hold the crankshaft solidly so that the face where the counterweights are later attached can be ground square with the shaft axis to within 0.0004 in. Grinder is equipped with an 18-in. cylinder wheel, which has a special diamond dresser to give required radius to one corner. Wheel is driven by a 30-hp. 900-r.p.m. motor. Vol. 84, p. 1036.

TURRET LATHE—*Warner & Swasey Co., 5701 Carnegie Ave., Cleveland, Ohio.* Redesigned No. 2-A saddle-type turret lathe has an effective swing of 20 in. and a bar capacity through the spindle of 3½ in. Major improvements include heavier-walled hexagon turret, completely redesigned apron, improved single lever control for feed selection, head brake, and better headstock lubrication. Machine has twelve spindle speeds running in geometric progression from 17 to 460 r.p.m. Universal cross slide has sixteen reversible power feeds. Vol. 84, p. 65.



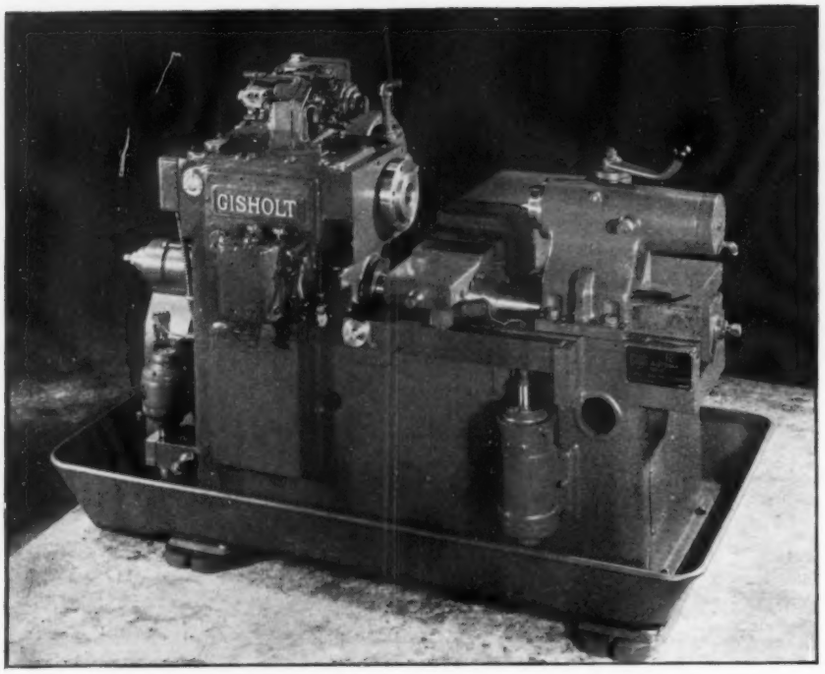


BENCH GRINDERS — *Independent Pneumatic Tool Co., 610 W. Jackson Blvd., Chicago, Ill.* Three "Thor" electric bench grinders are built for all-round service in grinding, buffing and wire wheel work. The 6-in. light duty (B-66), the 6-in. heavy duty (B-6), and the 7-in. heavy duty (B-7) all have completely inclosed ball bearing motors. Vol. 84, p. 734.

SPEED SELECTOR—*Gisholt Machine Co., 1201 E. Washington Ave., Madison, Wis.* Application of a speed selector to high-production turret lathes reduces floor-to-floor machining time on many parts as much as 50 per cent. Turning the dial to the work diameter gives correct speed. Vol. 84, p. 484.

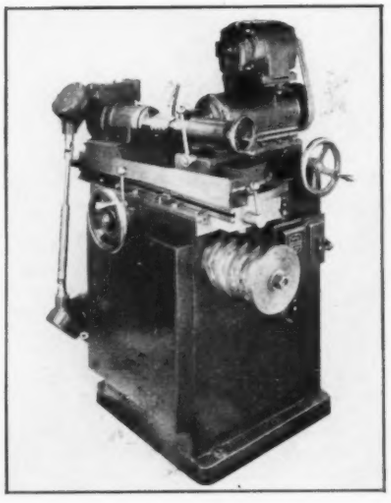
TOOL GRINDER—*Engineering Service, Inc., Box 44, Huntington Park, Calif.* "Strickland" precision chip breaker grinder has been designed for precision diamond wheel grinding of carbide cutting tools. When equipped with the "Strickland" universal quick setting ball joint vise, this machine permits grinding all angles of the cutting tool at one set-up. Ball-bearing wheel spindle runs at 3,450 r.p.m. Specifications: longitudinal table travel, 12 in.; transverse table travel, 6 in.; vertical movement, 5½ in. Vol. 84, p. 848.

MACHINE TOOLS—Lathes



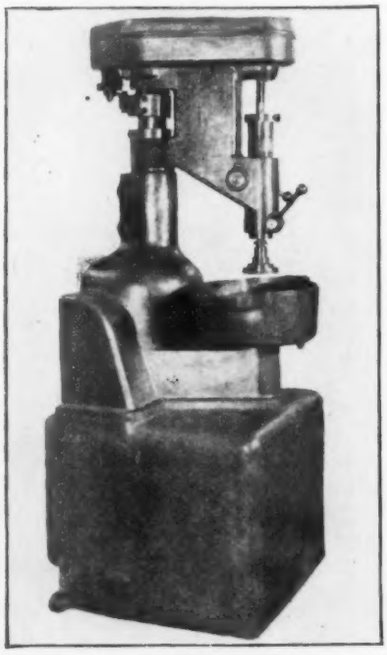
AUTOMATIC LATHE—*Gisholt Machine Co., Madison, Wis.* No. 12 hydraulic automatic lathe has been improved to increase capacity between centers from 18 to 22 in. Machine incorporates a redesigned cross feed elevating cylinder; a complete rearrangement of the air lock mechanism for the tailstock, entirely automatically controlled from the rear slide; and some repositioning of starting switches and operating levers. Operator only has to place the work in the machine and pull the control lever. Lathe provides a swing of 16¾ in. over the bed and 12 in. over the front carriage. All functions are handled by a single lever. Independent feeds are provided for front carriage and rear slides. Spindle speeds range from 62 to 325 r.p.m. Vol. 84, p. 345.

BENCH LATHE—*South Bend Lathe Works, 425 E. Madison St., South Bend, Ind.* Series S toolroom bench lathe is recommended for precision operations on small work. This 10-in. swing lathe has a 1-in. maximum collet capacity. Headstock has 1⅜-in. capacity through the spindle and can be equipped with either hand lever or handwheel type draw-in collet chuck. Twelve spindle speeds from 50 to 1,357 r.p.m. are provided. Quick change gear mechanism provides power longitudinal carriage feeds from 0.0015 to 0.0836 in., power cross feeds from 0.0006 to 0.0313 in., and 48 right and left-hand screw threads from 4 to 224 per inch. This lathe is made in 3, 3½, 4 and 4½ ft. bed lengths, providing up to 34⅜ in. between centers. Vol. 84, p. 517.

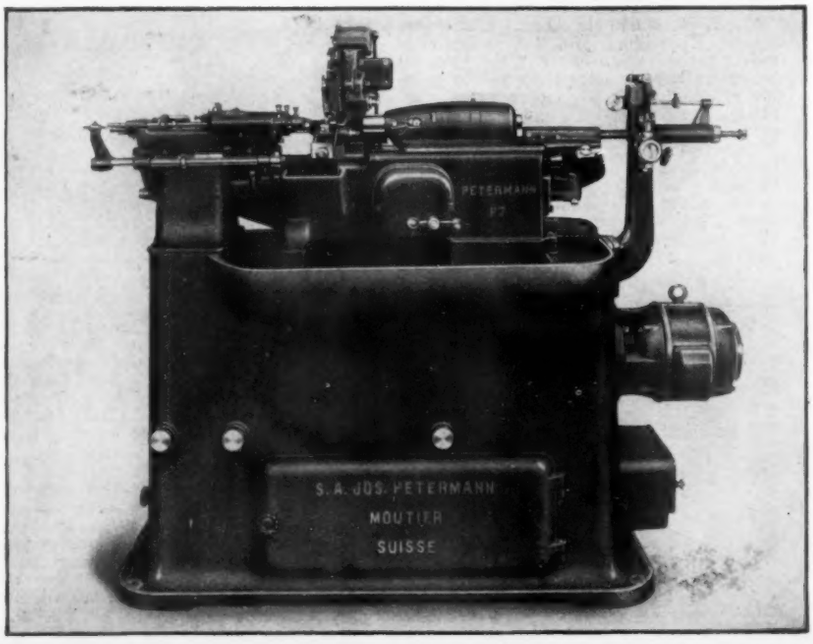


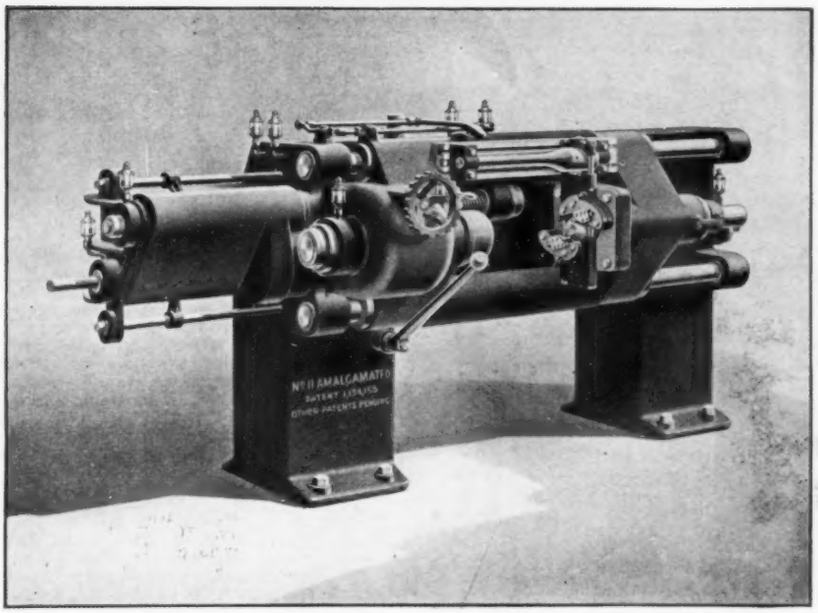
MILLING LATHE—*Hunter Engineering Co., Blaine & Pachappa Sts., Riverside, Calif.* Designed to cut conical spirals of increasing and decreasing pitches, and of irregular contour, this spiral milling lathe indexes automatically for fluting. It will cut conics of compound angles and will machine a complete cutter as used on oil toolbits without attention from the operator. Machine will support work 10⅜ in. long between centers and will swing work up to 10 in. diameter. Vol. 84, p. 391.

AUTOMATIC SCREW MACHINE—*Russell, Holbrook & Henderson, Inc., 99 Hudson St., New York, N. Y.* The Swiss-made Petermann Model P7 automatic screw machine has a nominal capacity of 0.280 in. through the spindle. With an enlarged spindle this capacity is 0.360 in. Work is fed by headstock through a revolving or stationary bushing. Seventeen speed changes are obtainable by pick-off gears. For each spindle speed there are 58 camshaft speeds. Standard machine has a spindle speed range of 1,800 to 10,000 r.p.m. Vol. 84, p. 183.

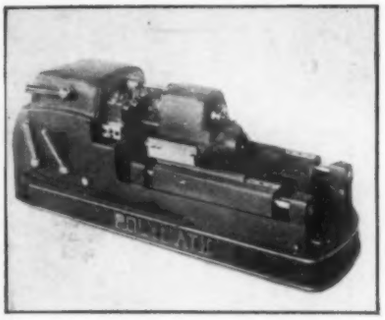


LAPPING MACHINE—*Ultra Lap Machine Co., 246 McDougall Ave., Detroit, Mich.* Any number of surfaces with virtually identical characteristics of flatness and smoothness can be produced on a production basis with the "Ultra-Lap" machine. Limits of less than one light band (0.000012 in.) for flatness and one micro inch r.m.s. for flatness and smoothness can be met. Vol. 84, p. 993.

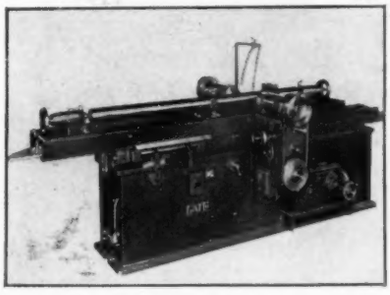




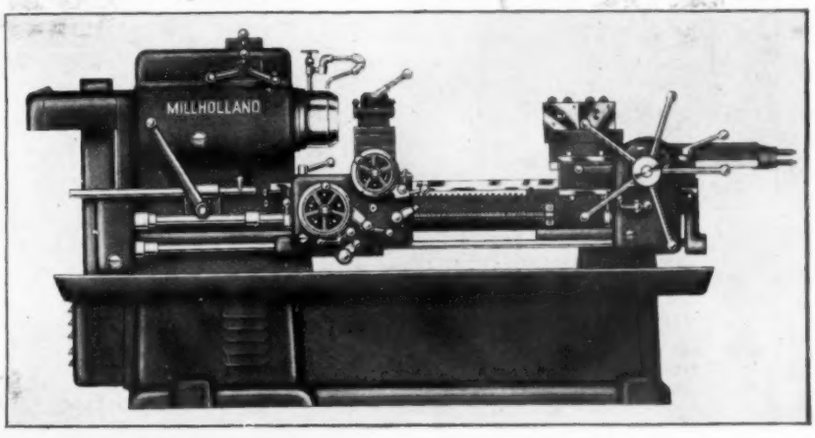
SHELL TURNING MACHINE—*Prescott Co., Menominee, Mich.* No. 11 "Amalgamated" shell turning machine, designed by Lucien I. Yeomans, is adapted to other uses. Former-controlled contour turning attachments are adapted to carriages which travel axially along the work. Upon the 2 15/16-in. cylindrical ways is carried a longitudinally movable frame, carrying both live and tailstock spindles. Whole frame travels with the work, held between live and dead centers by fluid pressure applied at the tailstock. Tools are longitudinally fixed in position and may be held in multiple toolholders. Formed work requires different tool head upon which oppositely mounted cutting tools are radially movable under the control of a former. Capacity of the machine is for shells from 75 to 105 mm. Vol. 84, p. 551.

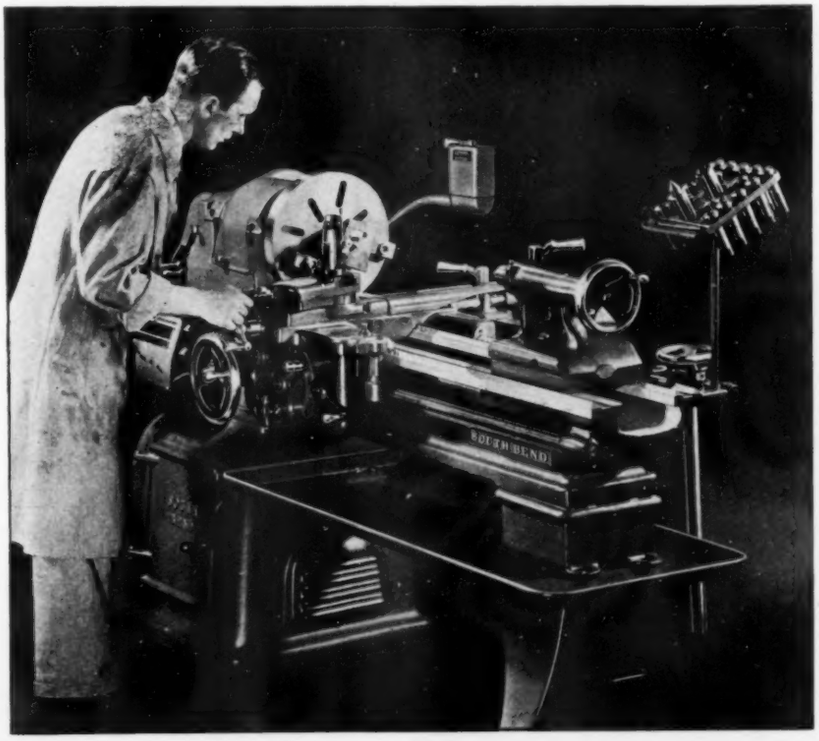


WIRE FORMER—*Unit Machinery Co., Rockford, Ill.* "Polymatic" high-speed wire forming and cut-off machine was developed for production of small precision screw machine parts. The following machining operations, or a combination of them, are obtainable: stock feed to fixed or swinging stop, forming and cut-off with two cross slide tools, and one or two end operations. Machine shown is equipped with a live pickup spindle, which is geared to the main spindle. A collet chucks the part while being cut off and prevents premature breaking off. Two models are available. No. 01 handles wire stock to $\frac{5}{16}$ in. diameter, and No. 11 machine will take stock up to $\frac{1}{4}$ in. in diameter. Spindle speeds range up to 15,000 and 10,000 r.p.m., respectively. Vol. 84, p. 549.



SPLINE MILLER—*Giern & Anholtt Tool Co., 1312 Mt. Elliott Ave., Detroit, Mich.* "Gatco" duplex spline miller has a capacity of 96 in. between centers and swings 5½ in. Cutters from $\frac{7}{8}$ to 1 in. can be used. Spindle speed range is 230 to 600 r.p.m. Vol. 84, p. 150.

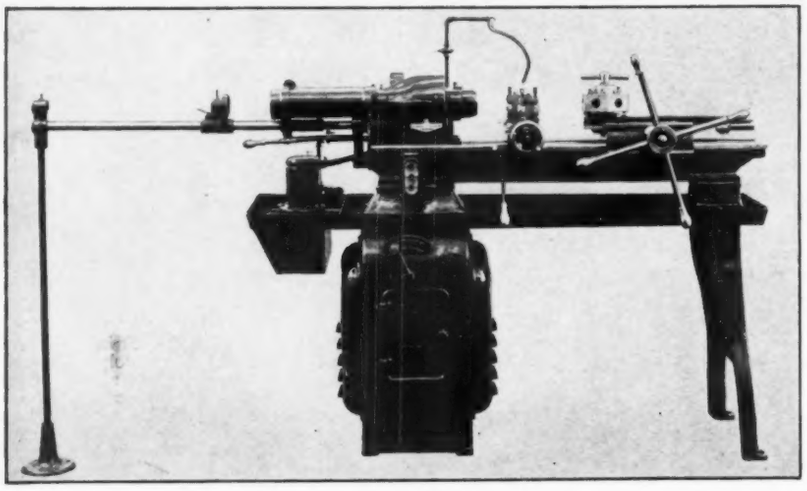




TURRET LATHE—*W. K. Millholland Machinery Co., 1115 E. 35th St., Indianapolis, Ind.* Greater rigidity through a box section sub-base which extends under the full length of the bed is one of the features of the improved No. 4 universal turret lathe. Swinging 20 in. over the ways and available in 1¾, 2 and 2½-in. bar capacities, this machine has a universal carriage with longitudinal travel of 24 in. and a turret ram with a travel of 12 in. Headstock has twelve speeds forward and reverse from 35 to 715 r.p.m., with automatic spindle brake. There are six feed changes in the apron, with six additional feeds obtained through the gear box. Turret saddle has six feed changes. Vol. 84, p. 777.

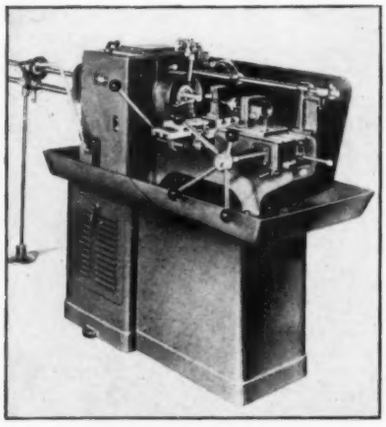
TOOLROOM LATHE—*South Bend Lathe Works, 426 E. Madison St., South Bend, Ind.* Series 8 toolroom lathe is claimed to be especially adapted to fine work. Attachments include handwheel type draw-in collet chuck, telescopic taper attachment, micrometer carriage stop, thread dial indicator, and chip pan. Fully inclosed underneath motor drive provides eight spindle speeds from 21 to 725 r.p.m. Quick-change gear mechanism provides 48 power longitudinal carriage feeds from 0.0015 in. to 0.0841 in., 48 power cross feeds from 0.0006 in. to 0.0312 in., and 48 right and left hand screw threads from 4 to 225 per in. Machine has a 16-in. swing. It is made in bed lengths of 6, 7 and 8 ft. with center distances of 34, 46 and 58 in. Vol. 84, p. 990.

MACHINE TOOLS—Lathes

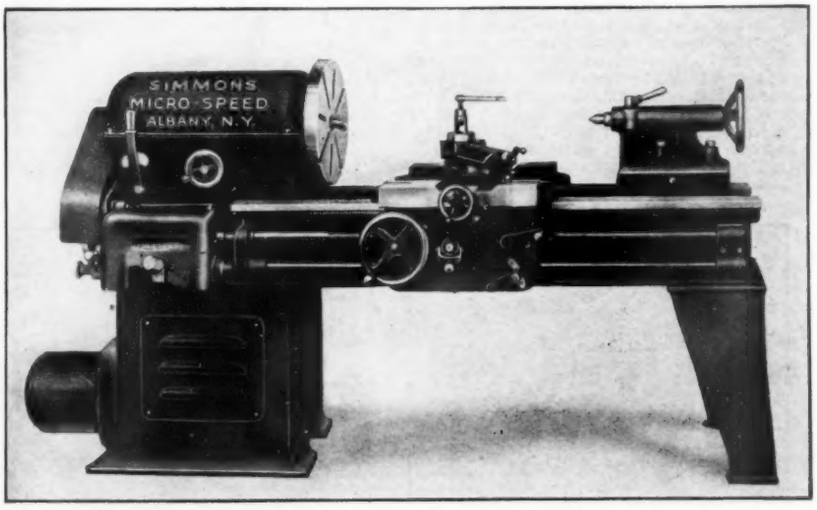


SCREW CUTTING MACHINE—*Brown Machine Co., 16 N. May St., Chicago, Ill.* In this underneath-drive screw cutting machine, the belt is shifted by a device consisting of two sliding belt guide arms moved by a hand lever on the front of the cabinet. It is unnecessary to loosen belt tension. Power feed is optional. Vol. 84, p. 778.

HEAVY-DUTY LATHES—*Simmons Machine Tool Corp., Albany, N. Y.* Maximum flexibility of spindle speeds without gears or clutches is achieved through "Micro-Speed" drive on a line of heavy-duty lathes. Drive, installed in cabinet-type leg, provides a virtually unlimited variation of spindle speeds by finger-tip control. Headstock spindle is mounted in Timken bearings, driven through multiple V-belts. Separate lead screw and feed rod preserve lead screw accuracy. This lathe is built in 16- and 12-in. sizes in the style illustrated, and in 18- and 20-in. sizes of an extra heavy duty model. Specifications, respectively: swing over ways, 16, 18, 18 and 20-in.; swing over carriage, 11, 13, 14 and 15 in.; distance between centers on 6-ft. bed, 30, 30, 28, 28 in. Vol. 84, p. 733.



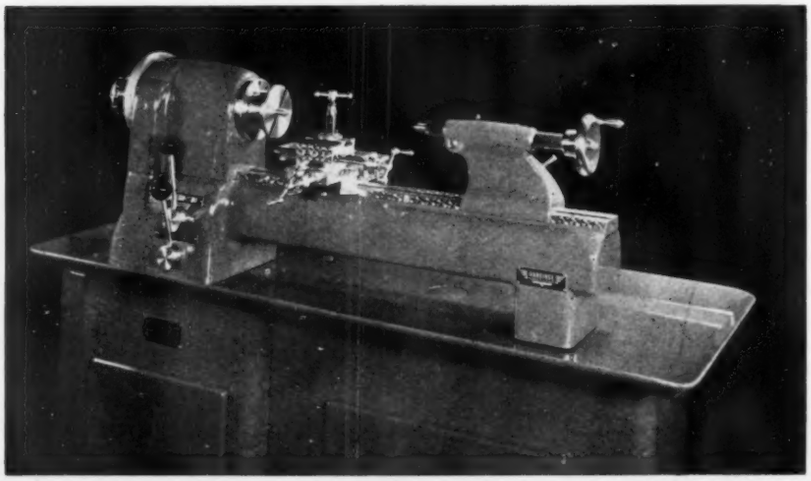
LATHE—*Oster Mfg. Co., 2056 E. 61st Pl., Cleveland, Ohio.* Designed primarily as a low cost manufacturing tool for simple turning operations, "Rapiduction" lathe has a capacity of 1½-in. round for cutting-off, boring, tapping, facing, and threading. Spindle speeds from 140 to 1000 r.p.m. are available. Machine has 13-in. swing over bed and 6 in. over cross slide. Vol. 84, p. 989.



PRECISION LATHES—*Hardinge Brothers, Inc., Elmira, N. Y.* High-speed precision bench lathes combine rugged construction with simplicity of design. Features include inclosed head with preloaded ball-bearing spindle, electrical driving unit with a multi-speed motor which eliminates all gears, clutches and pulleys, and a lever speed control at the headstock. V-belts may be changed without removing headstock spindle or bearing. This lathe is offered in five sizes up to 1-in. collet capacity and 9-in. swing. Vol. 84, p. 846.

SPEED LATHE—*Schauer Machine Co., 2060–8 Reading Road, Cincinnati, Ohio.* Considerable time can be saved with this new high-production speed lathe. Suitable for such light finishing operations as burnishing, lapping, burring and polishing, this machine has been especially designed to permit continuous high-speed operation. Collet and spindle are pedal controlled. Vol. 84, p. 841.

SPEED LATHE—*Standard Electrical Tool Co., 1940 W. Eighth St., Cincinnati, Ohio.* Developed for small parts requiring polishing, countersinking, reaming, burring and filing, this improved speed lathe has a clutch and brake arrangement for stopping the work spindle while the motor continues to operate. Machines are available with a single speed only, but can be furnished in any speed from 150 to 3,450 r.p.m. in sizes from ½ to 2 hp. Vol. 84, p. 436.



TIME-DATA SHEET NO. 29

Sensitive Drill Press Operations—V

(*Continued from Time-Data Sheet No. 28*)

Table No. 4—Drill Cold Rolled Steel or Hot Rolled Steel

Size of Drill — Inches	DEPTH OF HOLE IN INCHES														
	1/8	1/4	3/8	1/2	5/8	3/4	7/8	1	1 1/8	1 1/4	1 3/8	1 1/2	1 5/8	1 3/4	2
1/8	0.0009	0.0016	0.0023	0.0030	0.0036	0.0043	0.0050	0.0057	0.0064	0.0071	0.0078	0.0085	0.0092	0.0098	0.0113
9/64	0.0010	0.0016	0.0023	0.0030	0.0037	0.0044	0.0051	0.0058	0.0065	0.0073	0.0079	0.0087	0.0094	0.0101	0.0115
5/32	0.0010	0.0017	0.0024	0.0031	0.0038	0.0046	0.0053	0.0060	0.0067	0.0074	0.0081	0.0088	0.0096	0.0103	0.0117
11/64	0.0010	0.0018	0.0025	0.0032	0.0039	0.0047	0.0054	0.0061	0.0068	0.0076	0.0083	0.0090	0.0097	0.0105	0.0119
3/16	0.0011	0.0018	0.0026	0.0033	0.0040	0.0048	0.0055	0.0062	0.0070	0.0077	0.0085	0.0092	0.0100	0.0107	0.0122
13/64	0.0011	0.0019	0.0026	0.0034	0.0041	0.0049	0.0056	0.0064	0.0071	0.0079	0.0086	0.0094	0.0102	0.0109	0.0124
7/32	0.0012	0.0019	0.0027	0.0035	0.0042	0.0050	0.0058	0.0065	0.0073	0.0081	0.0088	0.0096	0.0104	0.0111	0.0127
15/64	0.0012	0.0020	0.0028	0.0036	0.0043	0.0051	0.0059	0.0067	0.0074	0.0082	0.0090	0.0098	0.0106	0.0113	0.0129
1/4	0.0013	0.0021	0.0028	0.0036	0.0044	0.0052	0.0060	0.0068	0.0076	0.0084	0.0092	0.0100	0.0108	0.0116	0.0131
17/64	0.0013	0.0021	0.0029	0.0037	0.0045	0.0053	0.0061	0.0069	0.0077	0.0085	0.0094	0.0102	0.0110	0.0118	0.0134
9/32	0.0014	0.0022	0.0030	0.0038	0.0046	0.0054	0.0063	0.0071	0.0079	0.0087	0.0095	0.0103	0.0112	0.0120	0.0136
19/64	0.0014	0.0022	0.0031	0.0039	0.0047	0.0056	0.0064	0.0072	0.0081	0.0089	0.0097	0.0105	0.0114	0.0122	0.0139
5/16	0.0015	0.0023	0.0032	0.0040	0.0048	0.0057	0.0065	0.0074	0.0082	0.0091	0.0099	0.0107	0.0116	0.0124	0.0141
21/64	0.0016	0.0025	0.0033	0.0042	0.0050	0.0059	0.0068	0.0077	0.0085	0.0094	0.0103	0.0111	0.0120	0.0129	0.0146
11/32	0.0017	0.0026	0.0035	0.0044	0.0053	0.0063	0.0072	0.0081	0.0089	0.0099	0.0108	0.0117	0.0126	0.0135	0.0153
23/64	0.0018	0.0028	0.0037	0.0046	0.0056	0.0065	0.0074	0.0084	0.0093	0.0102	0.0111	0.0121	0.0130	0.0139	0.0158
3/8	0.0020	0.0029	0.0039	0.0048	0.0058	0.0067	0.0077	0.0087	0.0096	0.0106	0.0115	0.0125	0.0135	0.0144	0.0163
25/64	0.0021	0.0031	0.0041	0.0050	0.0060	0.0070	0.0080	0.0090	0.0099	0.0109	0.0119	0.0129	0.0139	0.0149	0.0168
13/32	0.0022	0.0032	0.0042	0.0052	0.0062	0.0073	0.0083	0.0093	0.0103	0.0113	0.0123	0.0133	0.0143	0.0153	0.0173
27/64	0.0023	0.0034	0.0044	0.0054	0.0065	0.0075	0.0085	0.0096	0.0106	0.0116	0.0127	0.0137	0.0147	0.0158	0.0178
7/16	0.0025	0.0036	0.0046	0.0057	0.0067	0.0078	0.0088	0.0099	0.0110	0.0120	0.0131	0.0141	0.0152	0.0163	0.0184
29/64	0.0027	0.0038	0.0049	0.0060	0.0070	0.0081	0.0092	0.0103	0.0114	0.0125	0.0136	0.0147	0.0158	0.0169	0.0191
15/32	0.0028	0.0039	0.0051	0.0062	0.0073	0.0084	0.0096	0.0107	0.0118	0.0129	0.0140	0.0152	0.0163	0.0174	0.0197
31/64	0.0031	0.0043	0.0055	0.0066	0.0078	0.0090	0.0102	0.0113	0.0125	0.0137	0.0149	0.0160	0.0172	0.0184	0.0208
1/2	0.0034	0.0046	0.0059	0.0071	0.0083	0.0095	0.0108	0.0120	0.0132	0.0145	0.0157	0.0169	0.0181	0.0193	0.0218

Table No. 5—Drill Cast Steel or Axle Steel

Size of Drill — Inches	DEPTH OF HOLE IN INCHES														
	1/8	1/4	3/8	1/2	5/8	3/4	7/8	1	1 1/8	1 1/4	1 3/8	1 1/2	1 5/8	1 3/4	2
1/8	0.0010	0.0017	0.0025	0.0032	0.0040	0.0047	0.0055	0.0062	0.0070	0.0077	0.0085	0.0092	0.0100	0.0108	0.0122
9/64	0.0010	0.0018	0.0026	0.0033	0.0041	0.0048	0.0056	0.0064	0.0071	0.0079	0.0087	0.0095	0.0102	0.0110	0.0125
5/32	0.0011	0.0019	0.0026	0.0034	0.0042	0.0050	0.0057	0.0065	0.0073	0.0081	0.0089	0.0096	0.0104	0.0112	0.0127
11/64	0.0011	0.0019	0.0027	0.0035	0.0043	0.0051	0.0059	0.0066	0.0074	0.0082	0.0090	0.0098	0.0106	0.0114	0.0130
3/16	0.0012	0.0020	0.0028	0.0036	0.0045	0.0053	0.0061	0.0069	0.0077	0.0085	0.0094	0.0102	0.0110	0.0118	0.0134
13/64	0.0012	0.0021	0.0029	0.0037	0.0045	0.0054	0.0062	0.0070	0.0079	0.0087	0.0095	0.0104	0.0112	0.0120	0.0137
7/32	0.0013	0.0021	0.0030	0.0038	0.0047	0.0055	0.0063	0.0072	0.0080	0.0089	0.0097	0.0105	0.0114	0.0122	0.0139
15/64	0.0013	0.0022	0.0030	0.0039	0.0047	0.0056	0.0065	0.0073	0.0082	0.0090	0.0099	0.0107	0.0116	0.0124	0.0141
1/4	0.0014	0.0023	0.0031	0.0040	0.0049	0.0057	0.0066	0.0075	0.0083	0.0092	0.0101	0.0109	0.0118	0.0127	0.0144
17/64	0.0014	0.0023	0.0032	0.0041	0.0050	0.0058	0.0067	0.0076	0.0085	0.0094	0.0103	0.0111	0.0120	0.0129	0.0147
9/32	0.0015	0.0024	0.0033	0.0042	0.0051	0.0059	0.0068	0.0077	0.0086	0.0095	0.0104	0.0113	0.0122	0.0131	0.0149
19/64	0.0015	0.0025	0.0034	0.0043	0.0052	0.0061	0.0070	0.0079	0.0088	0.0097	0.0106	0.0115	0.0124	0.0133	0.0151
5/16	0.0016	0.0026	0.0035	0.0044	0.0054	0.0063	0.0072	0.0082	0.0091	0.0100	0.0109	0.0119	0.0128	0.0137	0.0156
21/64	0.0017	0.0027	0.0037	0.0046	0.0056	0.0065	0.0075	0.0084	0.0094	0.0104	0.0113	0.0123	0.0132	0.0142	0.0161
11/32	0.0019	0.0029	0.0039	0.0049	0.0059	0.0069	0.0079	0.0089	0.0099	0.0109	0.0119	0.0128	0.0138	0.0148	0.0168
23/64	0.0020	0.0030	0.0041	0.0051	0.0061	0.0071	0.0081	0.0092	0.0102	0.0112	0.0122	0.0133	0.0143	0.0153	0.0173
3/8	0.0022	0.0032	0.0043	0.0053	0.0064	0.0075	0.0085	0.0096	0.0106	0.0117	0.0127	0.0138	0.0149	0.0159	0.0180
25/64	0.0023	0.0034	0.0045	0.0056	0.0066	0.0077	0.0088	0.0099	0.0110	0.0121	0.0131	0.0143	0.0153	0.0164	0.0186
13/32	0.0024	0.0036	0.0047	0.0058	0.0069	0.0080	0.0091	0.0102	0.0113	0.0124	0.0136	0.0147	0.0158	0.0169	0.0191
27/64	0.0026	0.0037	0.0048	0.0060	0.0071	0.0082	0.0094	0.0105	0.0117	0.0128	0.0139	0.0151	0.0162	0.0173	0.0196
7/16	0.0027	0.0039	0.0051	0.0062	0.0074	0.0085	0.0097	0.0109	0.0120	0.0132	0.0144	0.0155	0.0167	0.0178	0.0201
29/64	0.0029	0.0041	0.0053	0.0065	0.0077	0.0089	0.0101	0.0113	0.0125	0.0137	0.0149	0.0161	0.0173	0.0185	0.0208
15/32	0.0031	0.0043	0.0056	0.0068	0.0080	0.0093	0.0105	0.0118	0.0130	0.0142	0.0155	0.0167	0.0179	0.0192	0.0216
31/64	0.0034	0.0047	0.0060	0.0073	0.0086	0.0098	0.0111	0.0124	0.0137	0.0150	0.0163	0.0176	0.0189	0.0202	0.0228
1/2	0.0038	0.0052	0.0065	0.0079	0.0093	0.0106	0.0120	0.0134	0.0147	0.0161	0.0175	0.0188	0.0202	0.0216	0.0243

(*Continued on Time-Data Sheet No. 30*)

STARRETT TOOLS

RATED AS ESSENTIAL *for* DEFENSE PRODUCTION

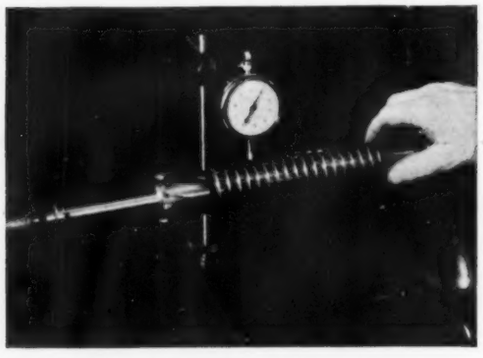
SHOPS DOING DEFENSE WORK ARE FINDING THESE STARRETT TOOLS EXTREMELY HELPFUL

"AS NECESSARY AS SKILLED MEN"

is the way these Starrett Vernier Tools are rated. Leading shops find Starrett Vernier Calipers, Height Gages and Depth Gages in constant use in toolrooms, die and mould departments and for all inspection work. Complete Vernier Tool equipment is a sound, long-term investment.

SPECIAL MICROMETERS IN DEMAND

Extra large sizes for armament and marine work, special shapes for sheet metal and aircraft operations, special features for production measuring and inspecting operations — these are the types of Starrett Micrometers finding wide use on defense work today. The more than 300 different models in the complete Starrett line makes it easy to select the one best Micrometer for any job.



TEST INDICATOR EXTREMELY USEFUL

Toolmakers, machinists and inspectors are using Starrett Dial Test Indicator No. 665 more than ever. Extreme simplicity, flexibility and ease of adjustment make it the right tool for countless testing, inspecting and comparing operations. Can be used on base or in machine tool posts. Has many special attachments. Dial reads 0-25-0 in half-thousandths with a range of 3/10". Large, clear face; sharp, clean calibrations insure easy, accurate reading.

WHERE TO FIND THE TOOLS YOU NEED

Starrett Catalog No. 26 "C" lists more than 3500 Precision Tools, Dial Indicators, Steel Tapes, Rules and Hacksaws which are available through leading supply houses. Make the Starrett Catalog your buying guide. Write for a copy.

THE L. S. STARRETT CO.

World's Greatest Toolmakers

Precision Tools . . Dial Indicators . . Ground Flat Stock Hacksaws . . Metal Cutting Bandsaws . . Steel Tapes

ATHOL, MASSACHUSETTS, U. S. A.

AVAILABLE THROUGH ALL LEADING SUPPLY HOUSES

TIME-DATA SHEET NO. 30

Sensitive Drill Press Operations—VI

(*Continued from Time-Data Sheet No. 29*)

PROCEDURE:

Pick up part and put on table, in vise or in jig; drill, tap, redrill, counterbore, countersink, burr and ream; remove part from table, vise or jig and lay aside.

TABLE OF DETAIL OPERATIONS:

Operation Symbol	Description of Operation	Allowed Time Std. Hours
A	Place jig or vise on drill table	0.0061
B	Remove jig or vise from drill table	0.0089
C	Check drawing	0.0220
D	Place tool or chuck in spindle	0.0012
E	Remove tool or chuck from spindle	0.0026
F	Place tool in chuck	0.0042
G	Remove tool from chuck	0.0050
H	Place tapper in spindle	0.0029
J	Remove tapper from spindle	0.0020
K	Place tapper collar on spindle and tighten	0.0102
L	Release tapper collar and remove	0.0068
M	Place tap in tapper	0.0147
N	Remove tap from tapper	0.0029
P	Place speed reducing pulley on spindle	0.0184
Q	Remove speed reducing pulley	0.0086
R	Set spindle stop for blind hole	0.0091
S	Sort out tool, per tool	0.0113
T	Go to toolroom and secure tools	0.0865
U	Get job and drawing	0.0500
V	Make out time slip	0.0178
W	Get and place steel blocks to keep work from swinging on drill table	0.0220
X	Start machine	0.0006
Y	Stop machine	0.0006
Z	Set table to height — No. 2 machine	0.0115
A_1	Set table to height — No. 3 machine	0.0365
B_1	Set spindle support — No. 2 machine	0.0050
C_1	Set spindle support — No. 3 machine	0.0118
D_1	Oil machine daily	0.1000

Table No. 6—Tap Brass, Cast Iron, Copper or Annealed Steel

Size of Tap	BRASS — Depth of Hole in Inches								CAST IRON — Depth of Hole in Inches							
	1/8	1/4	3/8	1/2	5/8	3/4	7/8	1	1/8	1/4	3/8	1/2	5/8	3/4	7/8	1
4–40	0.0003	0.0005	0.0007	0.0008	0.0010	0.0012	0.0014	0.0016	0.0004	0.0006	0.0009	0.0011	0.0013	0.0015	0.0018	0.0020
6–32	0.0004	0.0005	0.0007	0.0009	0.0010	0.0012	0.0014	0.0016	0.0005	0.0007	0.0009	0.0011	0.0013	0.0016	0.0018	0.0020
8–32	0.0004	0.0006	0.0008	0.0010	0.0012	0.0014	0.0016	0.0019	0.0005	0.0008	0.0011	0.0013	0.0016	0.0019	0.0021	0.0024
10–32	0.0005	0.0007	0.0010	0.0012	0.0014	0.0017	0.0019	0.0021	0.0006	0.0009	0.0012	0.0015	0.0019	0.0022	0.0025	0.0028
14–24	0.0005	0.0008	0.0010	0.0012	0.0014	0.0017	0.0019	0.0021	0.0007	0.0010	0.0013	0.0016	0.0019	0.0022	0.0025	0.0027
1/4–20	0.0005	0.0007	0.0009	0.0011	0.0013	0.0015	0.0017	0.0019	0.0007	0.0009	0.0012	0.0014	0.0017	0.0019	0.0022	0.0024
5/16–18	0.0006	0.0008	0.0011	0.0013	0.0015	0.0017	0.0019	0.0022	0.0008	0.0011	0.0014	0.0016	0.0019	0.0022	0.0025	0.0028
3/8–16	0.0007	0.0009	0.0012	0.0014	0.0016	0.0019	0.0021	0.0024	0.0009	0.0012	0.0015	0.0018	0.0021	0.0024	0.0027	0.0030
1/2–13	0.0009	0.0011	0.0014	0.0016	0.0019	0.0022	0.0024	0.0027	0.0011	0.0015	0.0018	0.0021	0.0025	0.0028	0.0031	0.0034
5/8–11	0.0011	0.0013	0.0016	0.0019	0.0021	0.0024	0.0027	0.0028	0.0014	0.0017	0.0021	0.0024	0.0028	0.0031	0.0035	0.0038
3/4–10	0.0012	0.0015	0.0018	0.0021	0.0024	0.0027	0.0030	0.0033	0.0016	0.0020	0.0024	0.0027	0.0031	0.0035	0.0039	0.0042

Size of Tap	COPPER — Depth of Hole in Inches								ANNEALED STEEL — Depth of Hole in Inches							
	1/8	1/4	3/8	1/2	5/8	3/4	7/8	1	1/8	1/4	3/8	1/2	5/8	3/4	7/8	1
4–40	0.0004	0.0007	0.0009	0.0012	0.0014	0.0017	0.0019	0.0022	0.0006	0.0009	0.0012	0.0015	0.0018	0.0021	0.0025	0.0028
6–32	0.0005	0.0007	0.0010	0.0012	0.0015	0.0017	0.0019	0.0022	0.0006	0.0009	0.0012	0.0016	0.0019	0.0022	0.0025	0.0028
8–32	0.0006	0.0009	0.0012	0.0014	0.0017	0.0020	0.0023	0.0026	0.0007	0.0011	0.0015	0.0018	0.0022	0.0026	0.0029	0.0033
10–32	0.0007	0.0010	0.0013	0.0017	0.0020	0.0023	0.0027	0.0030	0.0009	0.0013	0.0017	0.0021	0.0026	0.0030	0.0034	0.0038
14–24	0.0008	0.0011	0.0014	0.0017	0.0020	0.0023	0.0027	0.0030	0.0010	0.0014	0.0018	0.0022	0.0026	0.0030	0.0034	0.0038
1/4–20	0.0007	0.0010	0.0013	0.0015	0.0018	0.0021	0.0024	0.0026	0.0009	0.0013	0.0017	0.0020	0.0023	0.0027	0.0030	0.0034
5/16–18	0.0009	0.0012	0.0015	0.0018	0.0021	0.0024	0.0027	0.0030	0.0011	0.0015	0.0019	0.0023	0.0027	0.0031	0.0035	0.0038
3/8–16	0.0010	0.0013	0.0016	0.0020	0.0023	0.0026	0.0030	0.0033	0.0013	0.0017	0.0021	0.0025	0.0029	0.0034	0.0038	0.0042
1/2–13	0.0012	0.0016	0.0020	0.0023	0.0027	0.0030	0.0034	0.0037	0.0016	0.0020	0.0025	0.0030	0.0034	0.0039	0.0043	0.0048
5/8–11	0.0015	0.0019	0.0022	0.0026	0.0030	0.0034	0.0037	0.0041	0.0019	0.0024	0.0028	0.0033	0.0038	0.0043	0.0048	0.0052
3/4–10	0.0017	0.0021	0.0026	0.0030	0.0034	0.0038	0.0042	0.0046	0.0022	0.0027	0.0033	0.0038	0.0043	0.0048	0.0054	0.0059

(*Continued on Time-Data Sheet No. 31*)

STAYS ON THE JOB

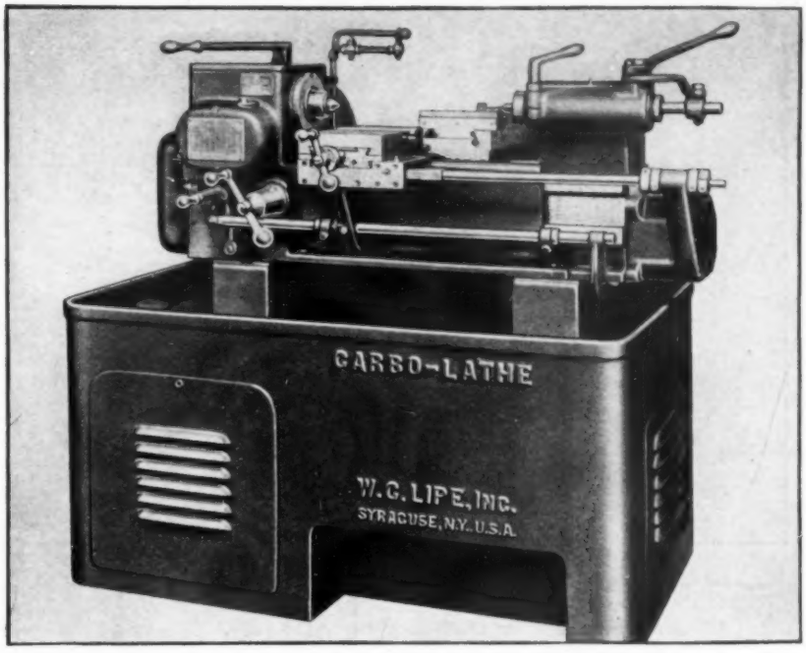
In fair weather or foul the bobbing buoy stays on the job . . . So do New Britain Automatics, as they plow through heavy production schedules — turning out work for American Defense with unfailing regularity and continuing accuracy — reducing rejects — cutting costs. You can rely on New Britain Automatics. New Britain-Gridley Machine Division, The New Britain Machine Company, New Britain, Connecticut.

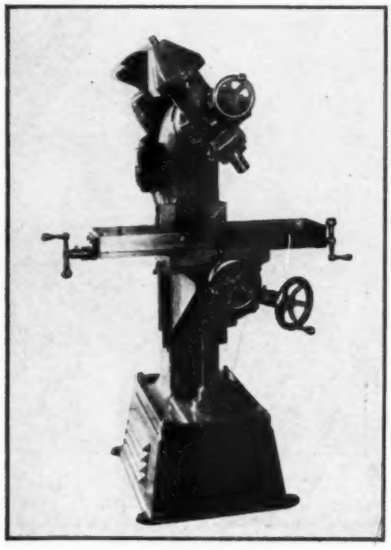
NEW BRITAIN AUTOMATICS
Stay on the job

MODEL **60**

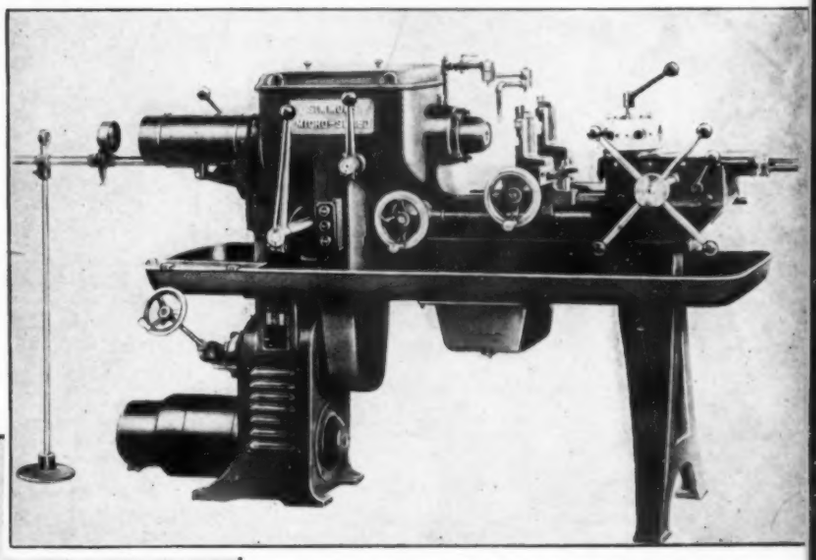
A complete line of Screw Machines — Four and Six Spindles to 2¼" Capacity
Also a complete line of Chuckers — Four, Six and Eight Spindles to 10¼" Capacity

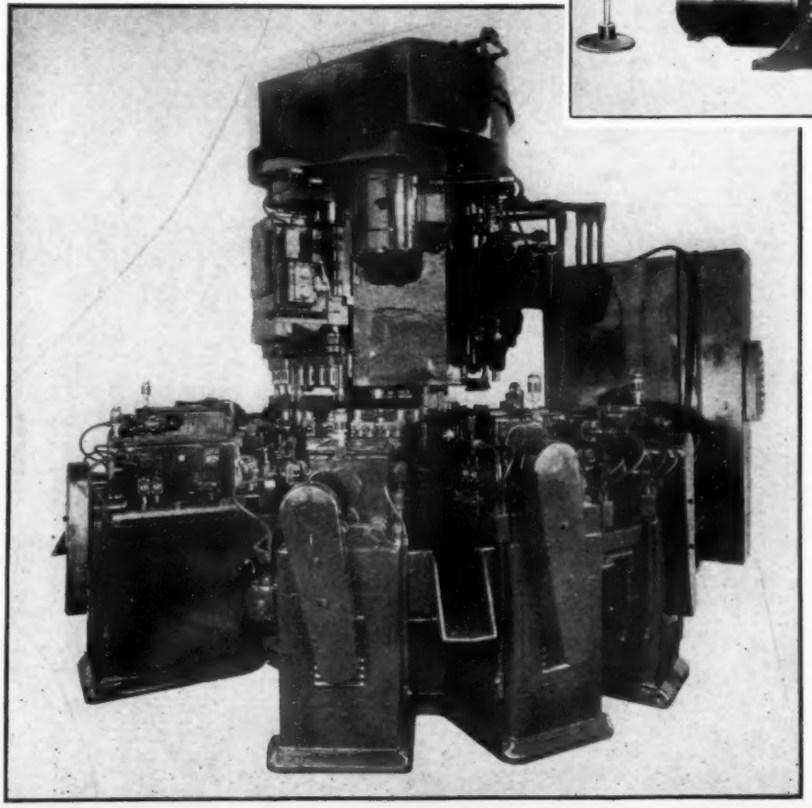
"CARBO-LATHE"—*W. C. Lipe, Inc., 208 S. Geddes St., Syracuse, N. Y.* Designed for high-production turning with modern alloy tools, the "Carbo-Lathe" incorporates improvements to add rigidity and increase ability to take heavy cuts in tough materials at high speed. Cabinet is larger to accommodate a 10-hp. motor. Base also houses a coolant tank double in capacity, and a large chip pan. Size permits 12 in. swing and 18 in. between centers. Power is applied through worm drive. The 600-lb. headstock and bed are cast in one solid piece of chrome-nickel iron. Vol. 84, p. 995.





VERTICAL MILLER—*Jackson Machine & Tool Co., 248–250 E. Wesley St., Jackson, Mich.* Designed especially for high-speed precision milling, boring and drilling operations, this vertical-head machine permits pockets, slots, angles and compound angles up to 90 deg. to be machined without disturbing work. V-belt drive provides five spindle speeds from 200 to 3,000 r.p.m. Vol. 84, p. 225.

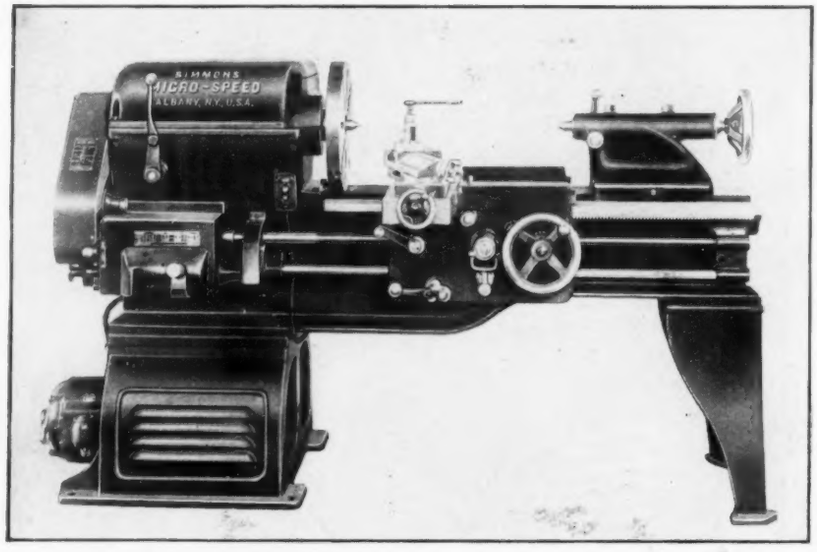




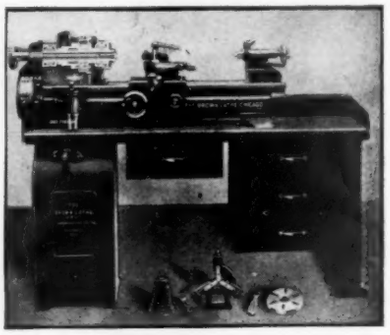
SCREW MACHINE—*Simmons Machine Tool Corp., Albany, N. Y.* An unusual advantage claimed for the No. 2 turret screw machine is the "Micro-Speed" drive which provides 1,000 spindle speeds at the twist of a handwheel. Machine has a spindle mounted on Timken tapered roller bearings and has all bearings for sliding members accurately hand scraped. Head is cast solid with the bed to insure greatest rigidity. Cut-off is by lever, although screw feed can be furnished. Specifications: swing over bed, 14 in.; swing over cross slide, 6 in.; automatic chuck capacity, 1 in. Vol. 84, p. 731.

STATION-TYPE MACHINE—*Snyder Tool & Engineering Co., 3400 E. Lafayette St., Detroit, Mich.* Two special station-type machines straddle mill, drill and ream the hanger boss on an automobile rear-axle housing flange forging. Side head straddle mills the bosses, while vertical head drills and reams boss holes. Head feeds are powered by individual pumps and hydraulic circuits, Vickers equipment being used. Production is about 180 flanges per hour. Vol. 84, p. 29.

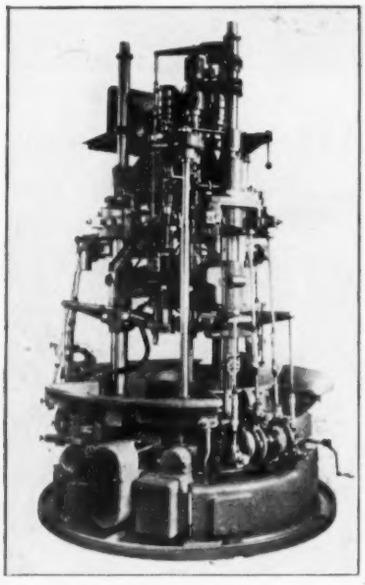
MACHINE TOOLS—Lathes



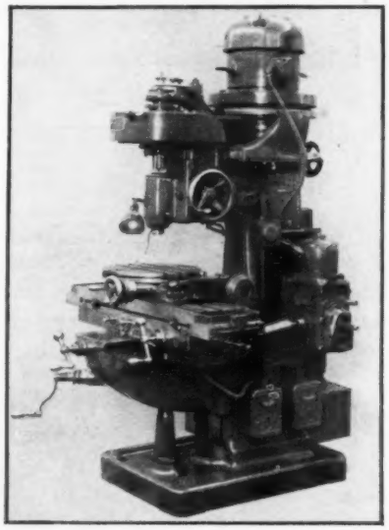
GAP BED LATHE—*Simmons Machine Tool Corp., Albany, N. Y.* Maximum flexibility of spindle speeds without gears or clutches is achieved through the use of the "Micro-Speed" drive on a new line of gap bed lathes. This drive, installed in the cabinet type leg, provides a virtually unlimited variation of spindle speeds by finger-tip control. Removable gap blocks in the bed permit greater swing through the gap. Lathe is equipped with Timken bearings on the main spindle, which is driven through V-belts. Lathe is built in 16-25 in. and 18-27 in. sizes. Specifications, respectively: swing over ways, 18 and 19 in.; swing through gap, 25½ and 27¼ in.; total width of gap, 14 and 14 in.; width of each gap block, 7 in.; swing over carriage, 12 and 13 in.; distance between centers on 6-ft. bed, 36 and 36 in. Vol. 84, p. 894.



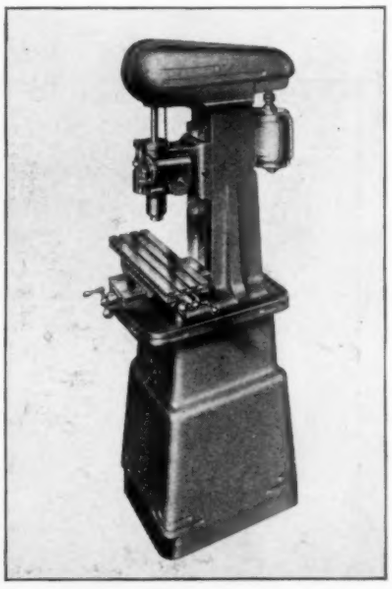
BENCH LATHE—*Brown Machine Co., 1½-16 N. May St., Chicago, Ill.* Model SP 9-in. swing underneath drive bench lathe is suitable for screw cutting and other precision operations. Mounted on a steel cabinet bench, this lathe is provided with a headstock having a 1-in. collet capacity spindle mounted on two large double Timken bearings. Automatic shifter changes belt on three-step pulley without first slackening it. Bed lengths of 36, 42, 48 and 60 in. provide center distances of 16, 22, 28 and 40 in. Vol. 84, p. 729.



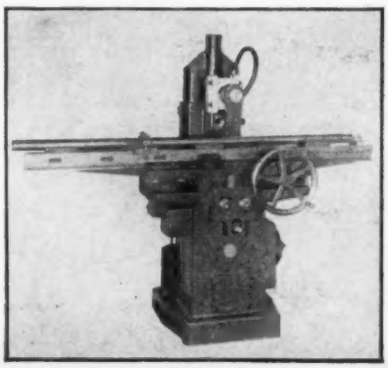
SCREW MACHINE—*Cosa Oversea Trading Corp., 5000-4 Chrysler Bldg., New York, N. Y.* "Gyromatic" vertical automatic screw machine occupies only a fraction of the floor space needed by conventional horizontal types. Other advantages include reduction of noise, virtual elimination of vibration, greater convenience and increased safety. Diameters and lengths of parts can be adjusted to within 0.001 in. while machine is in operation. All slides are simple tool posts taking usual turret lathe tools. They are actuated by easily interchangeable independent cams. The six boring, tapping and reaming spindles coming from below allow chips to drop out of holes, making deep-hole drilling easier. All three current models have six spindles. Capacities for bar work are 1, 1⅝ and 2¼ in.; for chuck work, 4, 5½ and 7½ in. If soft metals are to be machined, larger sizes can be chucked. Either air or mechanically operated chucks can be used. All machines have individual drive from a single motor. Vol. 84, p. 895.



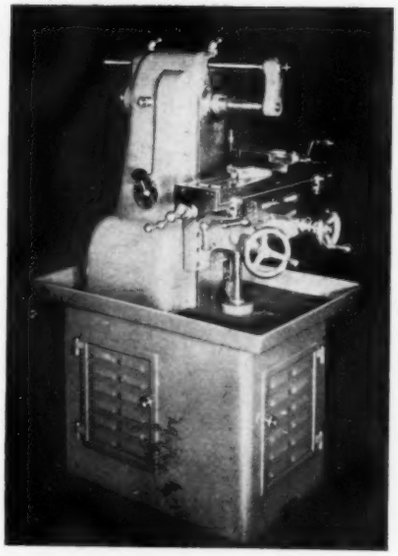
DIE SINKER—*Reed-Prentice Corp., Worcester, Mass.* No. 3VG vertical miller and die sinker, which supersedes the No. 3V machine, provides slow spindle speeds ranging from 135 to 320 r.p.m. in back gear. Open-belt speeds range from 400 to 2,600 r.p.m. Machine has the same dimensions and capacities as the No. 3V model. Specifications: Longitudinal power feed, 24 in.; cross feed to table, 12 in.; vertical adjustment of knee, 18 in.; vertical adjustment of head on column, 5 in.; maximum distance from spindle to table, 18 in.; maximum distance to rotary table, 13½ in.; maximum distance to column, 16 in.; table working surface, 10¼x36 in.; approximate floor space required, 57x70 in.; machine height, 80 in. Vol. 84, p. 261.



VERTICAL MILLER — *Machinery Mfg. Co., Dept. 10, P.O. Box 155, Vernon Branch, Los Angeles, Calif.* "Vernon" combination vertical milling machine and jig borer has been designed for work on jigs, fixtures, dies and general milling operations. It can be equipped with dial indicators and measuring plugs for precise work. A profiling attachment can be used. Machine has a maximum distance of 10½ in. from table top to spindle bottom. Spindle drive is equipped with back gearing and provides eight speeds from 250 to 4,200 r.p.m. Vol. 84, p. 394.



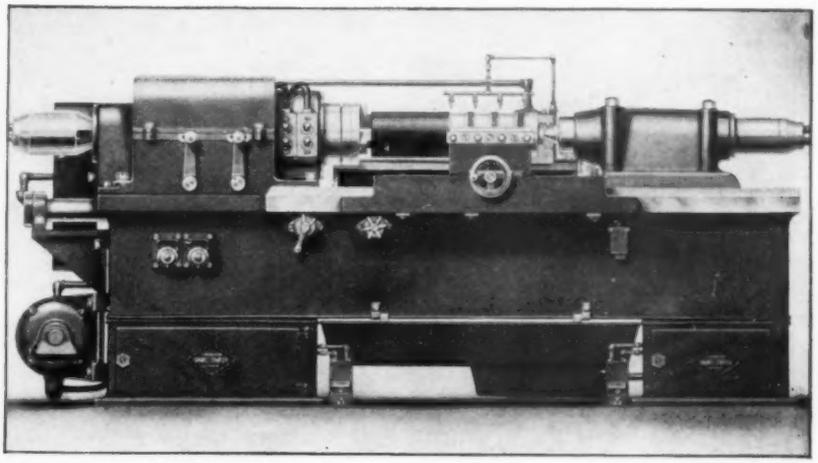
HORIZONTAL MILLING MACHINE —*Kent-Owens Machine Co., 958 Wall St., Toledo, Ohio.* No. 1-V horizontal milling machine with vertical feed is arranged especially for milling Woodruff keyways and performing similar operations on long parts. After the work has been properly set, automatic vertical head movement is obtained hydraulically. Pick-off gears provide a spindle speed range of 100 to 1,335 r.p.m. Infinitely variable feed rate from ¾ to 80 in. per min. can be obtained. Vol. 84, p. 226.



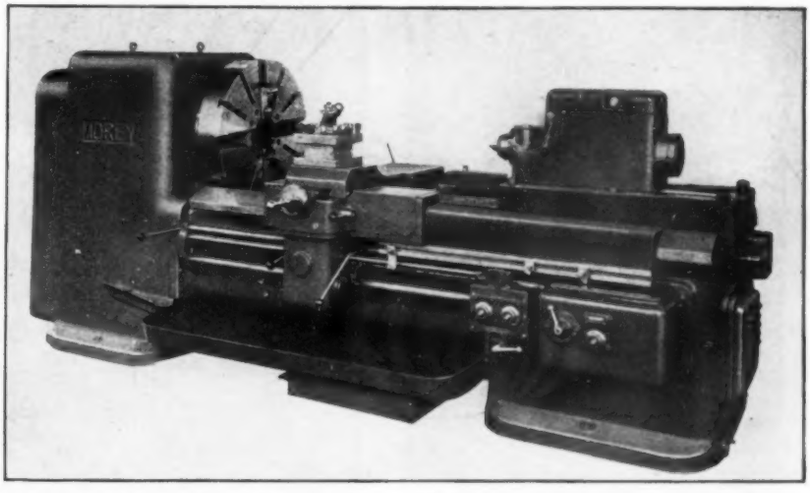
TOOLROOM MILLER — *Hardinge Bros., Inc., Elmira, N. Y.* Replacing the Type BB5 miller, the Type TM precision preloaded ball bearing toolroom miller is designed to take heavy cuts accurately. A longer vertical travel allows use of the index head in a vertical position. Miller provides two spindle speed ranges, from 110 to 1850 r.p.m. or 110 to 2,775 r.p.m. Machine is operated by one lever only. All driving members are completely inclosed. Vol. 84, p. 309.

MILLING MACHINE—*Atlas Press Co., Kalamazoo, Mich.* This bench milling machine is designed for efficient small piece milling. Three types of table controls are available: standard screw feed, rapid-production lever feed, and "Changeomatic" feed for instant selection of automatic table feeds. A wide range of spindle speeds is provided. Specifications: table working surface, 4½x18 in.; longitudinal table travel, 12 in. (10 in. with "Changeomatic"); vertical table travel, 6 in.; over-all dimensions, 25½x32½x22 in. Vol. 84, p. 1101.

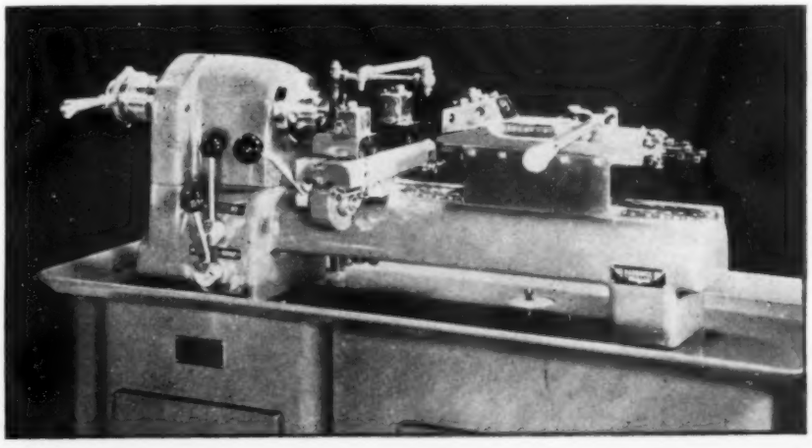
SCREW MACHINE—*Hardinge Bros., Inc., Elmira, N. Y.* This high-speed precision second operation machine performs same operations as previous hand screw machines. Designed for fast production with high precision, it features inclosed head with preloaded ball bearing spindle, electrical driving unit with multi-speed motor, convenient lever speed control at headstock, and all-steel welded pedestal. Automatic collet closer permits rapid opening and closing of collets or step chucks while spindle is at speed or stopped. Two levers at the headstock control spindle speed through electrical motor controls. There are eight forward and eight reverse speeds ranging from 230 to 3900 r.p.m. Machine has a 1-in. collet capacity, 6-in. step chuck capacity and a 9-in. swing. Vol. 84, p. 1042.



SHELL LATHE—*Sparks-Simplex Machinery Corp., 49 Wall St., Norwalk, Conn.* No. 101-A "Hydro-Matic" lathe is designed especially for manufacture of shell and small guns. It machines all sizes of shell from 75 to 155 mm., with construction rigid enough to accommodate multiple tooling with maximum cutting speeds permitted by carbide tools. Principal features include Timken bearings, chain drive for motors of 10 to 50 hp., three-speed headstock, and hydraulic longitudinal feeds with automatic stop and rapid traverse. Feeds from 0.008 to 0.040 in. are obtained by dial adjustment. Quick chucking on inside chucking operations is accomplished by hydraulic cylinders connected through the spindle and operated through the main hydraulic supply line. Extra-long attachments permit turning of small guns. Vol. 84, p. 1038.

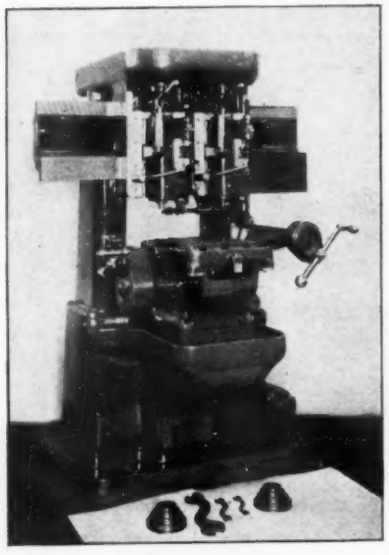


SHELL LATHE—*Morey Machinery Co., 410 Broome St., New York, N. Y.* Featuring directional fingertip control, the 27-in. heavy duty hydraulic manufacturing lathe is especially adapted to machining shell. Designed for single purpose operations, it is built to utilize maximum speeds and feeds which present day cutting materials permit. Machine is assembled from basic units so that a combination will produce equipment for machining shell from rough forging, ready for thread milling. Lathe is also built with hexagon turret with individual stops, mounted on a separate saddle. Spindle is mounted on Timken bearings, front and rear. Diameter of spindle bore is 6 in. All driving mechanism is inclosed in the headstock and is controlled at the carriage. Hydraulic feeds are controlled from carriage apron, so that operator's position remains with cutting tools. Controls are interlocked. Carriage can be supplied in five combinations to cut a great variety of work. Vol. 84, p. 1044.



MACHINE TOOLS—Millers

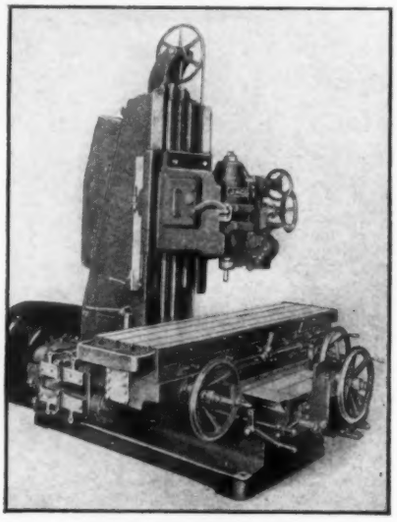
PLAIN MILLER—*Brown & Sharpe Mfg. Co., Providence, R. I.* No. 12 electrically controlled plain milling machine has been increased in capacity. Column height has been increased 4 in.; spindle adjustment is now 10½ in. Base width has been increased 2½ in. Distance from head face to arbor yoke support measures 17⅛ in. Vol. 84, p. 435.

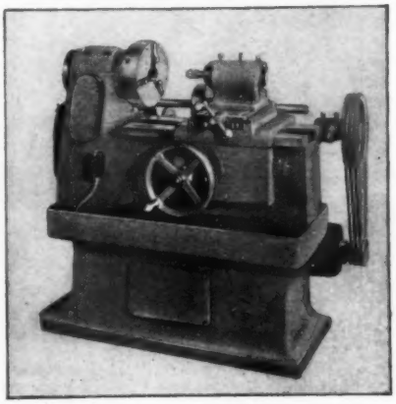


VERTICAL PROFILER—*New York Tool Co., 406 Broome St., New York, N. Y.* No. 12M high-speed vertical profiler and miller is offered for economical manufacture of small parts requiring accurate interchangeability. Two-spindle machine shown is standard; single-spindle machines can be furnished on special order. They can be equipped with bearings for speeds of 10,000 r.p.m. Spindles are driven independently by dynamically balanced vertical motors through four-step V-belts. Vol. 84, p. 308.

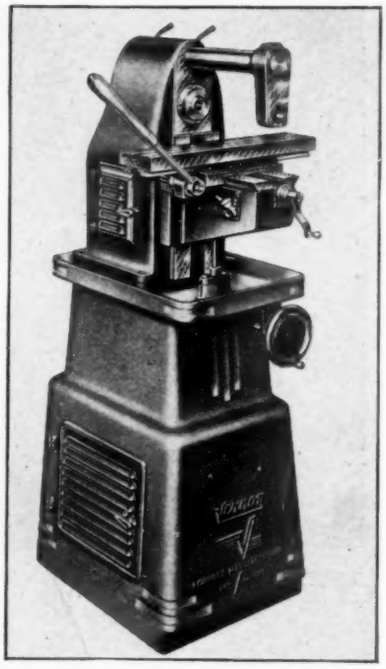
CONTOUR MILLING MACHINE—*Snyder Tool & Engineering Co., 3400 E. Lafayette St., Detroit, Mich.* High nickel-chrome aircraft engine master rods are contour milled in 30 min. on this special miller. Machine also is suitable for articulated rods and other contour milling operations of similar nature by changing the master cam. Automatic cycle involving four distinct work movements is employed. Rod contour is completed with all cuts blended together. Vol. 84, p. 515.

DIE SINKER—*Jackson Machine & Tool Co., 248–250 E. Wesley St., Jackson, Mich.* No. 10 duplex typeless die sinker has a cherry tool mechanism at the right of the spindle on the tool head. Narrow or wide semi-circular depressions with straight or nearly straight ends can be made quickly. Its practical application is in squaring up ends of depressions, forming depressions to make flanges forged on ends of crankshafts or for cams forged integral with camshafts, and similar depressions in forging dies. Vertical movement of head is 23¾ in.; spindle speed, 40 to 413 r.p.m.; strokes of cherrying tool, 13 to 138 per min. Vol. 84, p. 223.

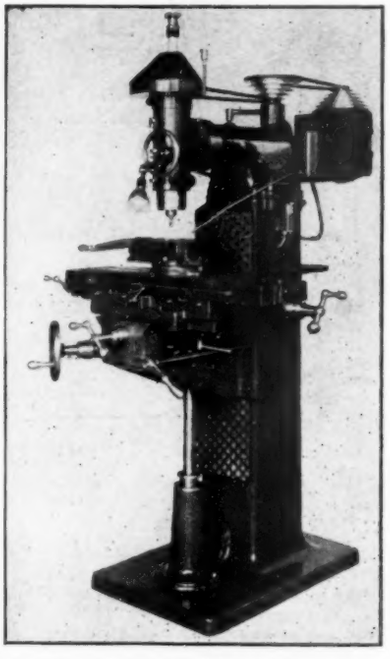




HOB THREAD MILLER—*James Coulter Machine Co., 386 Mountain Grove St., Bridgeport, Conn.* Type H semi-automatic hob thread milling machine varies speeds and feeds through pick-off gearing. By camshaft control, it is only necessary to set the hob to suitable depth on the first piece, after which duplication is assured without manual adjustments. Capacity: swing over carriage, 14 in.; maximum external thread, 7 in. Vol. 84, p. 223.

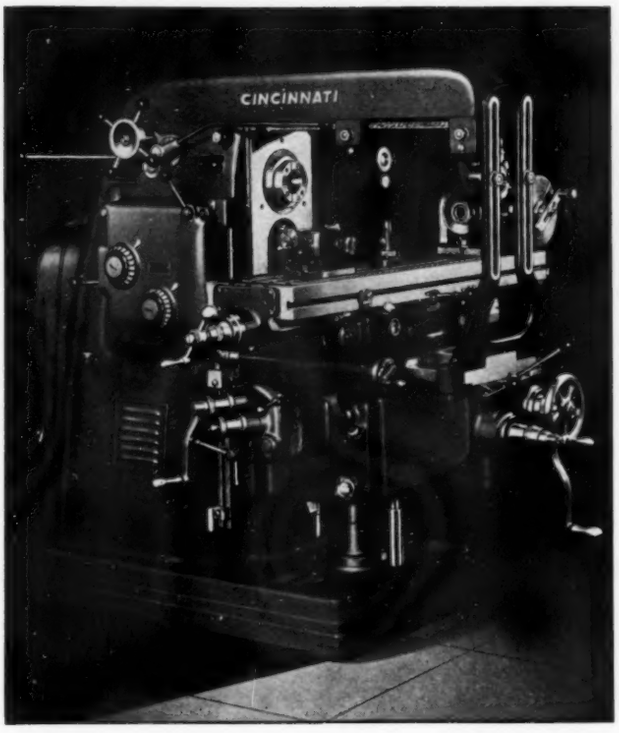


MILLING MACHINE — *Machinery Mfg. Co., 3636 Irving St., Vernon, Los Angeles, Calif.* An addition to the Vernon line of precision milling machines is the No. 0 hand miller for high speed milling of small parts. Two standard speed ranges are available—100 to 1,000 r.p.m., and 150 to 1,500 r.p.m. Variable drive is fully inclosed. Heat-treated and ground spindle is mounted on Timken bearings. Power is provided by a ½-hp., 1,750 r.p.m. motor. Over-all height of this machine is 58 in. Net weight is approximately 650 lb. Vol. 84, p. 683.

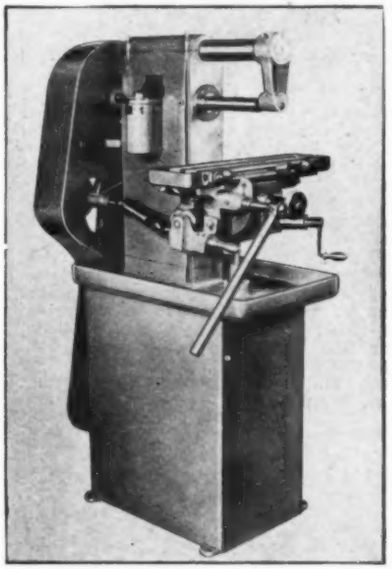


MILLING MACHINE—*Midway Machine Co., 2324 University Ave., St. Paul, Minn.* No. 2½ "Millmaster" vertical milling machine is designed for a wide range of work with high speed and high precision. Standard two-pulley model provides spindle speeds of 275 to 4,300 r.p.m. while the three-pulley model has speeds from 70 to 10,000 r.p.m. A 1-hp. ball bearing motor is used. Over-all height of stationary-quill model is 72 in.; that of movable-quill model is 80 in. Weight is approximately 1,600 lb. Vol. 84, p. 592.

Millers—MACHINE TOOLS

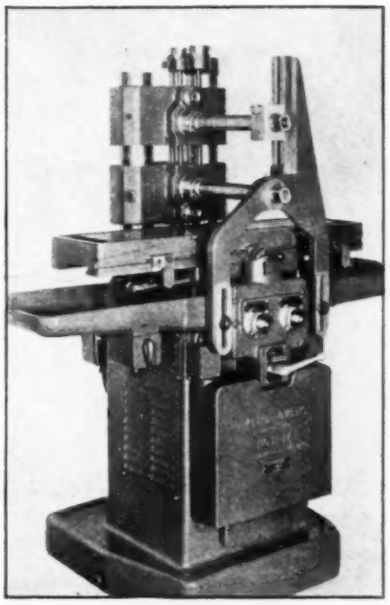


DIAL-TYPE MILLING MACHINES—*Cincinnati Milling Machine Co., Cincinnati, Ohio.* Designed for rapid metal removal to close limits with easy operation, these plain, universal and vertical dial type milling machines are built in three sizes: Nos. 2, 3, and 4. They are available with two speed-feed ranges, medium speed and high speed. Speeds and feeds are controlled by a single lever at the front of the machine, duplicated at the operator's rear working position. Machine does the work of shifting gears for both feeds and speeds. All power control and hand adjustment levers are grouped conveniently at the front operating position. No. 2 universal miller is illustrated. Four anti-friction bearings are incorporated in the spindle mounting, rear bearings being mounted in a sleeve. Automatic lubrication is provided. Hydraulic servo control engages the clutch. This permits the spindle to be "inched" with negligible effort. Vol. 84, p. 307.

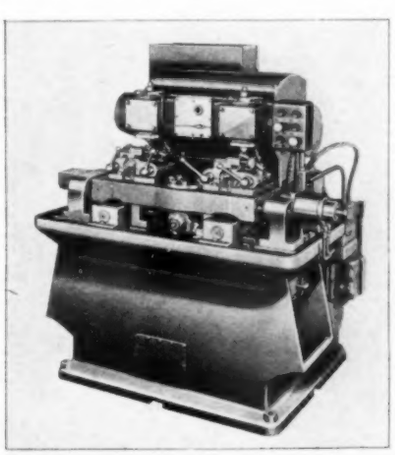


MILLING MACHINE — *Miller & Crowningshield, Greenfield, Mass.* Improved hand and power feed milling machine uses V-belt drive to give greater speed range and greater convenience in changing belts. A ½-hp. motor with a reversing switch is standard equipment, but a ¾- or 1-hp. motor is recommended for high-speed work. Motor and jack-shaft each have a 3-step V-pulley. Four interchangeable single V-pulleys provide 12 speeds from 180 to 3,200 r.p.m. Vol. 84, p. 942.

MILLING MACHINE—*J. D. Duffy & Son, 544 Insurance Exchange Building, Detroit, Mich.* "Univertical" high-speed end milling machine has been developed for smaller jobs and simpler operations. Equipped with a swivel head graduated 90 deg. on both sides of the perpendicular, this compact machine mills, drills and bores. It can also be adapted to small grinding operations. With a base 11x17 in., it is powered by a heavy-duty ¼-hp. motor. Over-all height is 37 in. Vol. 84, p. 777.



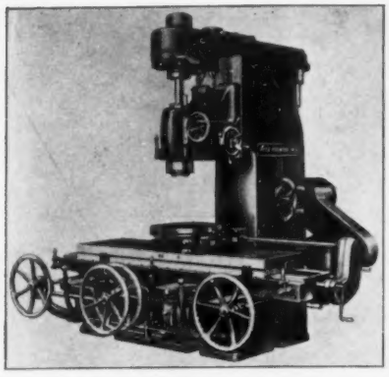
MILLING MACHINES—*Kent-Owens Machine Co., Toledo, Ohio.* A line of milling machines with double spindles is especially suited for splitting bushings, milling slots in pistons, etc. Spindles are adjustable vertically and independently of each other. Center distance between them is 4¾ in. minimum and 11 in. maximum. Two panel dials control table feed from ½ to 80 in. per min., one dial being used for fine feeds, the other for coarse. Shown are double spindles mounted on the No 1-14 hydraulic milling machine. This machine has a 14-in. table travel and a 9x32 in. table. Double spindle arrangement can also be applied to the Nos. 1-M and 1-8 machines. Vol. 84, p. 637.



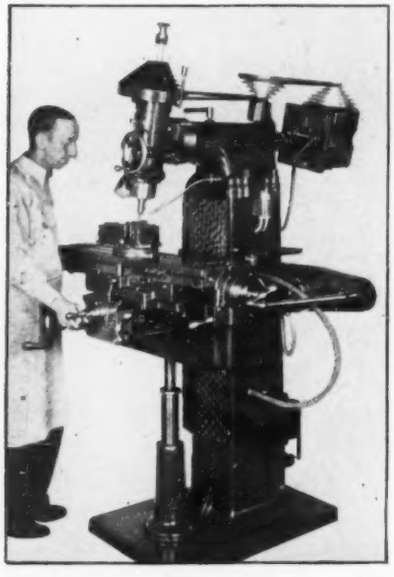
PROFILING MACHINE — *National Broach & Machine Co., 11457 Shoemaker St., Detroit, Mich.* All that the operator has to do in running this "Red Ring" profiling machine is to load and unload the two work fixtures. Machine holds finished work to a tolerance of 0.002 in. Profiling is restricted to the milling of profiles, internal or external, flat or undercut, on parts having a profile pattern not larger than 6x8x2 in., where the cut is ⅛ in. deep or less on a face ¾ in. wide or less. Machine utilizes a closed differential hydraulic circuit to actuate its movement. A master pattern or cam controls all motions. Cutter spindles are individually motor driven. Vol. 84, p. 549.

TOOLROOM MACHINE — *Hannifin Mfg. Co., 621–631 S. Kolmar Ave., Chicago, Ill.* No. 10 toolroom machine combines in one compact unit a precision lathe, sensitive drill press, horizontal milling machine and vertical milling machine. In addition to convenient handling of regular toolroom work, this machine may be used for economical production of many parts made in small quantities. Vol. 84, p. 436.

MACHINE TOOLS—Millers, Shapers

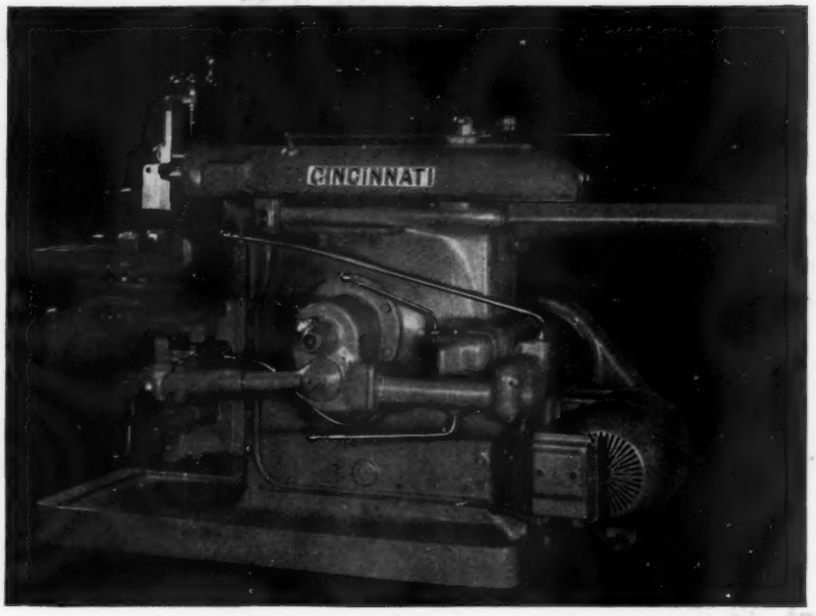


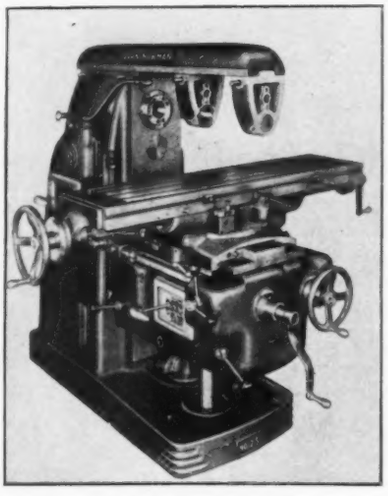
DIE SINKER—*Reed-Prentice Corp., Worcester, Mass.* A totally inclosed gear drive, with all shafts running on Timken bearings, is used in the No. 6 vertical miller and die sinker. Head provides double back gearing with drive to spindle at lowest point, securing maximum power and rigidity. Saddle extends full table length, forming a rigid support. Longitudinal and cross feed screws are of heat-treated chrome molybdenum steel, with threads milled and polished. Power rapid table traverse in either direction operates at 95 in. per min. Twelve spindle speeds from 15 to 500 r.p.m. are available. For each spindle speed there are eight feeds. Vol. 84, p. 989.



MILLING MACHINE—*Midway Machine Co., 2324 University Ave., St. Paul, Minn.* Several improvements have been made in the recently announced "Millmaster" vertical milling machine. De luxe models now include center or third pulley attachment and table power feed attachment as standard equipment. Table length has been increased from 26 to 38 in., and weight from 1,600 to 1,800 lb. A ¼-hp. motor provides seven feeds forward and reverse. Vol. 84, p. 842.

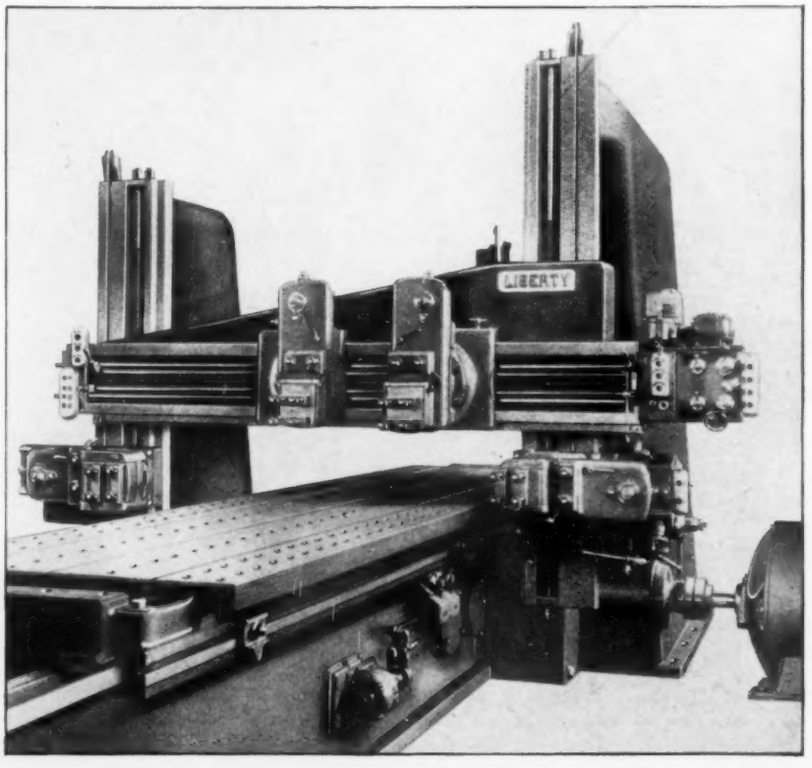
MOVABLE-HOUSING PLANER—*Liberty Machine Tool Co., 1050 Weller Ave., Hamilton, Ohio.* This planer with a movable, motorized left-hand housing has maximum distance between housings of 73 in., with a minimum distance of 42 in. All heads and tool slides have power rapid traverse and power feed in all directions. Housings are of heavy construction, with extremely wide faces. All screws are stationary with revolving nuts operating on thrust bearings. Machine has electrically operated mechanical friction feed throughout to all heads, allowing the rail and each side head to be independent units with separate motors for each unit. Vol. 84, p. 847.



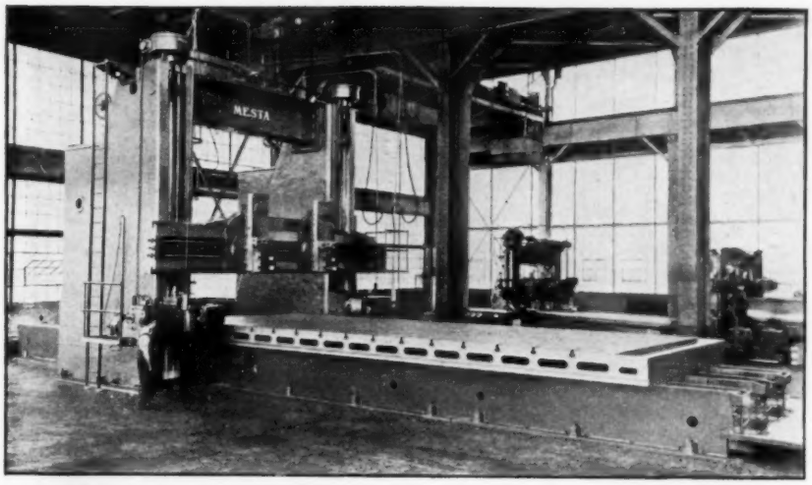


SHAPERS—*Cincinnati Shaper Co., Cincinnati, Ohio.* Rail clamping, elevating and lowering controls are conveniently located on the operator's side of these power rapid traverse shapers. An improved automatic circulating oiling system with additional reservoirs also is incorporated. These shapers are built in standard or universal types from 16 to 36 in. sizes. Feeding motion is actuated by a series of cams. Strokes per minute range from 11 to 138 for the 16-in. size to 8 to 102 for the 36-in. shaper. Vol. 84, p. 223.

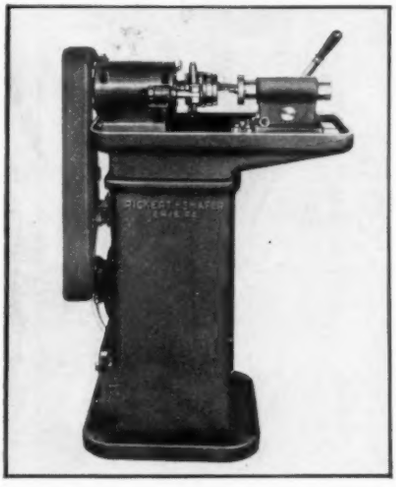
HORIZONTAL MILLER—*Van Norman Machine Tool Co., 160 Wilbraham Ave., Springfield, Mass.* A companion to No. 2-L machine is No. 2-S horizontal miller available in both plain and universal types. It has 18 spindle speeds from 25 to 1,250 r.p.m., selected by a single lever, as are the 18 feeds which have directional control at both front and rear. Power rapid traverse in all directions is provided. Machine has a 5x12-in. table. Vol. 84, p. 844.



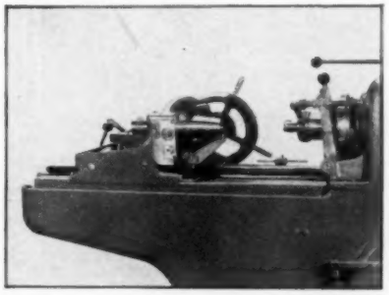
Threading Machines, Planers—MACHINE TOOLS



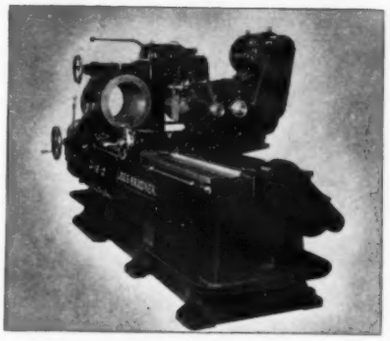
HEAVY-DUTY PLANER—*Mesta Machine Co., P.O. Box 1466, Pittsburgh, Pa.* Said to be one of the largest heavy-duty planers ever built, this planer for accurately machining large castings measures 16 ft. between housings and will clear 14 ft. under the rail. The 430x150-in. table bears on one V-way and two flat ways. Bed length is 61 ft. Six electric motors drive it. Vol. 84, p. 346.



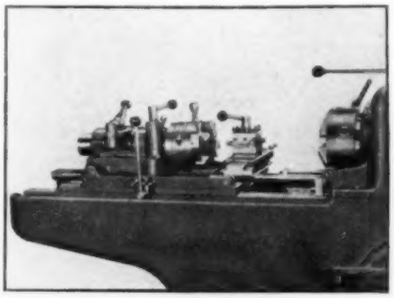
THREADER AND TAPPER—*Rickert-Shafer Co., 613 W. Eleventh St., Erie, Pa.* This improved horizontal hand threading machine is designed for use wherever a variety of second operation threading and tapping jobs must be performed. It has capacity to ¾ in. diameter. Vol. 84, p. 107.



THREADING MACHINE — *Landis Machine Co., Waynesboro, Pa.* Although designed primarily for cutting external threads, the "Landmaco" threading machine shown is fitted with a Style ALT collapsible tap to cut internal threads on the fuze plug end of shell. Special accessories for this arrangement include a gage arm, special round grips and a work-supporting cradle. Machine will tap a number of sizes. Vol. 84, p. 262.

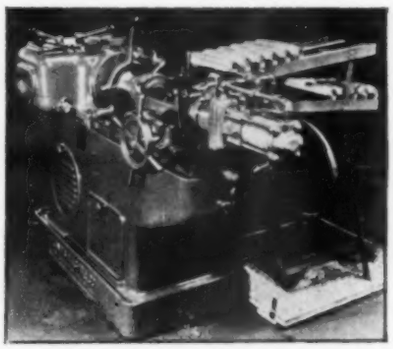


THREAD MILLING MACHINE—*Lees-Bradner Co., 6210 Carnegie Ave., Cleveland, Ohio.* Model CT chucking type heavy thread milling machine is arranged for generation of threads by the ring type or hobbing process, using either shank or shell type cutters. Having a 13-in. hole through the work spindle and a swing over the ways of 24 in., it is adapted for threading parts of considerable size which require utmost precision. Control is through pushbuttons. Drive from both motors is through inclosed V-belts. Work spindle, driven by precision worm and worm wheel, is arranged for installation of various types of work-holding fixtures. Extreme rigidity has been built into the cutter head. Three methods of traversing the head are available. Machine is arranged with an automatic depth stop. Vol. 84, p. 685.

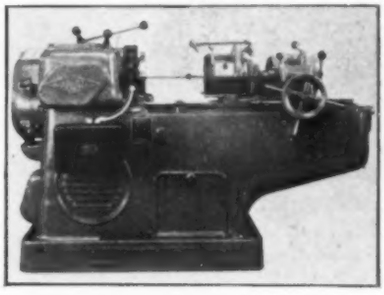


THREADING MACHINE — *Landis Machine Co., Waynesboro, Pa.* This "Landmaco" threading machine reconditions and threads rock-bit rods. It employs a three-jaw universal chuck on the machine spindle instead of a revolving die head. Vol. 84, p. 392.

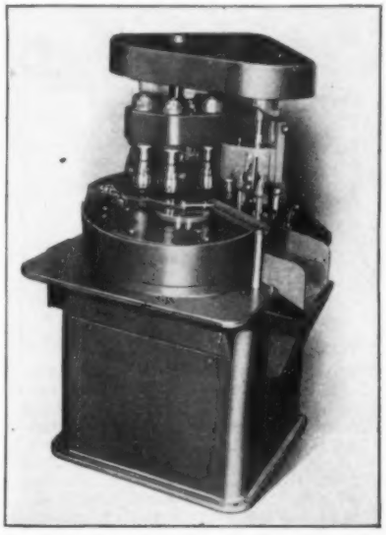
THREADING MACHINE — *L. J. Kaufman Mfg. Co., Manitowoc, Wis.* This semi-automatic threading machine threads and reams 1,600 to 2,100 steel pieces per hour. Loading is done by hand, with parts ejected automatically at the side. Machine incorporates a 30-station dial. A 3-hp. motor supplies power through V-belts and geared heads. Vol. 84, p. 66.



SHELL TAPPER—*Landis Machine Co. Waynesboro, Pa.* This "Landmaco" No. 1½ R shell tapper designed especially for tapping nose end of shell ranging from 75 to 155 mm. in diameter possesses all features of other "Landmaco" threading machines, plus others to assure exceptionally accurate tapping on an unusually high production basis. Special carriage comprises a work supporting cradle, hardened and ground bushing which supports the nose end of the work, and female center which supports the base end of the work. Spindle is equipped with a special collapsible steel tap. Tripping collar functions as a pilot to assure maintenance of unusually close tolerances for alignment of thread and body. Danger of chasers striking the shoulder at the bottom of the work to cause breakage is eliminated. Vol. 84, p. 939.

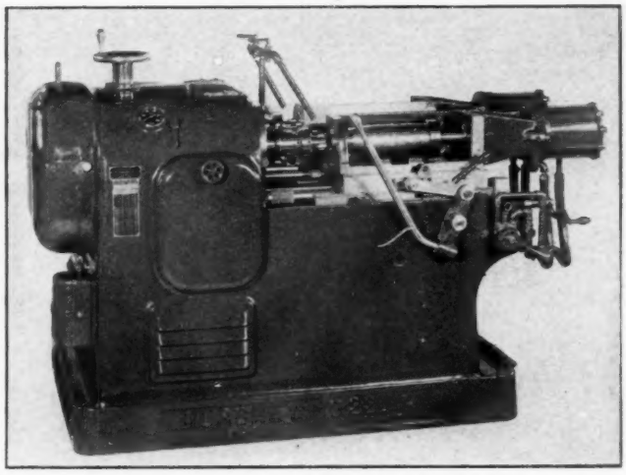


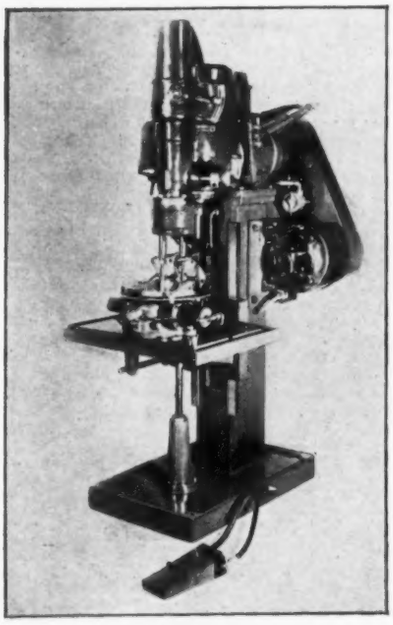
THREADING MACHINE — *Landis Machine Co., Waynesboro, Pa.* An unusually flexible "Landmaco" threading machine is designed for special operations in which extremely close tolerances for concentricity must be maintained between thread and work body. Special features include faceplate on the spindle supplanting the usual die head, a special carriage front on which the die head is mounted, and a tailstock which is adjustable and which also supports the center. Ways are long enough to handle work from 2 to 16 in. long. Vol. 84, p. 688.



MACHINE TOOLS—Tapping Machines

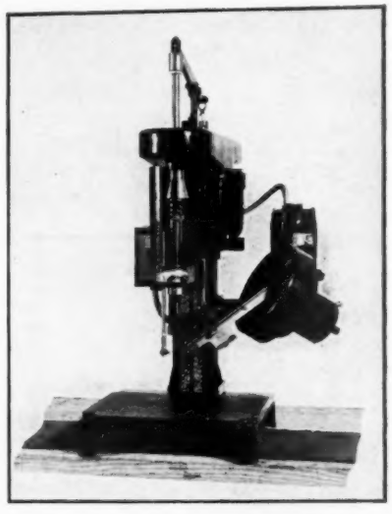
SHELL TAPPERS—*Murchey Machine & Tool Co., 951 Porter St., Detroit, Mich.* Series of single and double spindle machines is especially designed to tap and chamfer the nose end of shell. Illustrated is a double spindle machine arranged with lead screws to tap and chamfer 4.5 Naval H.E. shell. Special shell holding fixtures include hardened and ground pads which locate the shell within a few thousandths of concentricity with the spindle. Machine spindles are equipped with Murchey Type M hardened and ground collapsible taps, which include four reaming tools as well as four chasers. Taps are actuated by yokes operating between adjustable stops which trip taps to predetermined thread length and reset them. Sequence of operations is to chamfer shell with tap chasers collapsed and with lead screws disengaged. Carriages are then returned, automatically expanding the chasers for tapping, lead screw is thrown in and the shell is tapped in perfect alignment. Vol. 84, p. 1097.



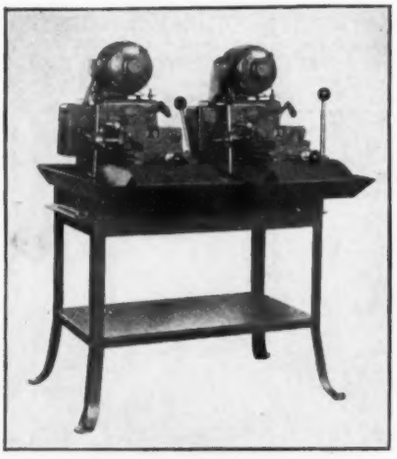


TAPPING MACHINE—*L. J. Kaufman Mfg. Co., Manitowoc, Wis.* No. 5-A "Hi-Duty" tapping machine has a No. 40 index and 8 station chucking dial arranged to hold circular pieces for tapping. Chucking jaws, or complete dial, can be changed to accommodate different work of a similar nature. Two pieces are produced at each stroke of the two-spindle head. Ejection of finished parts is automatic. All operations are interlocked to prevent damage. Work dials to accommodate 8, 12 and 16 stations can be furnished. All operations are performed with air pressure. Vol. 84, p. 438.

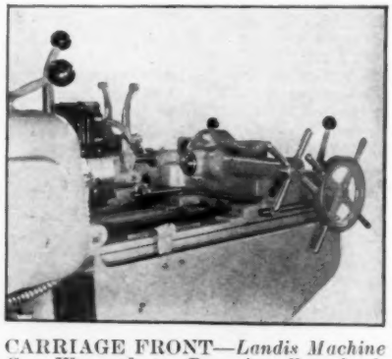
PRODUCTION TAPPER — *Marburg Bros., Inc., 90 West St., New York, N. Y.* This sensitive production tapper, developed to meet the needs of manufacturers of electric shavers, clocks and other small precision mechanisms, includes a super-sensitive friction clutch. Machine is claimed to be of particular advantage when tapping plastics or other delicate parts which may break should the tap strike bottom. A simple adjustment changes the tapper into a power screw-driver. Machine comes complete with reversible motor. Vol. 84, p. 938.



POWER SCREWDRIVER — *Detroit Power Screwdriver Co., 5365 Rohns Ave., Detroit, Mich.* Model A magazine feed power screwdriver has a range from No. 2 to N. 6 screws from ⅛ to ⅞ in. long. Spindle clutch is said to be so sensitive that there is no danger of twisting off screw heads, even when driving a No. 2 brass screw. Vol. 84, p. 346.

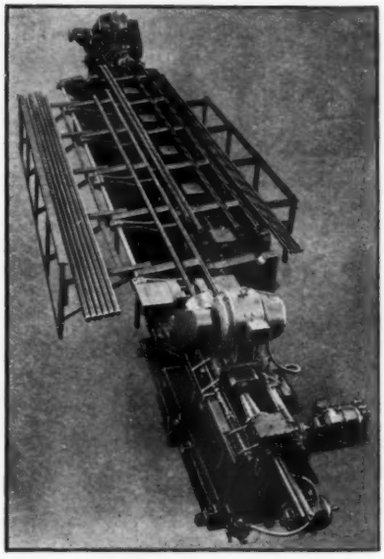


THREADING MACHINE—*Geometric Tool Co., New Haven, Conn.* Double-spindle threading machine is furnished in three sizes with a complete threading range from $\frac{1}{16}$ to 1½ in. diameter. It is economical where thread length is sufficient to allow operator time to unload and chuck one work-holding device while a thread is being cut in the other. Vol. 84, p. 346.

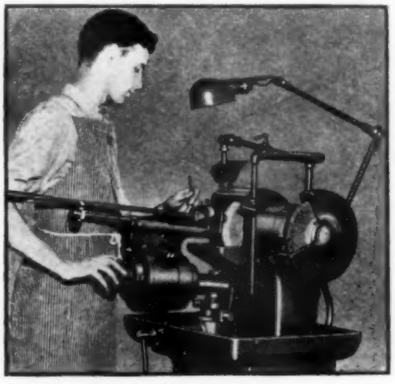


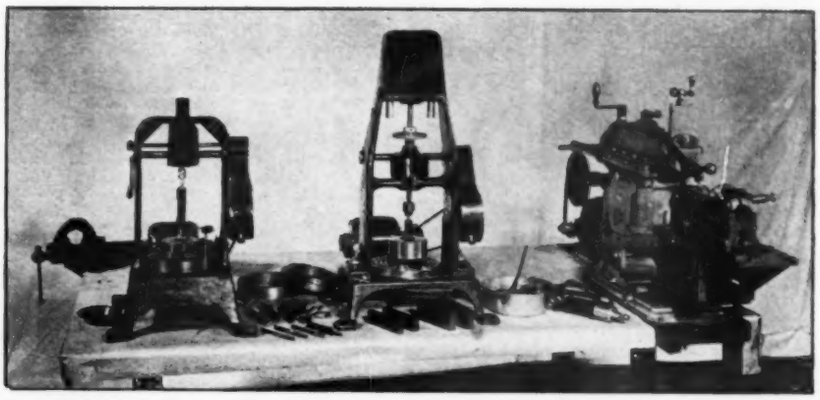
CARRIAGE FRONT—*Landis Machine Co., Waynesboro, Pa.* A collet chuck carriage front for use on "Landmaco" and Landis standard threading machines is provided with a collet-holding device of the type usually employed on automatic screw machines. Vol. 84, p. 147.

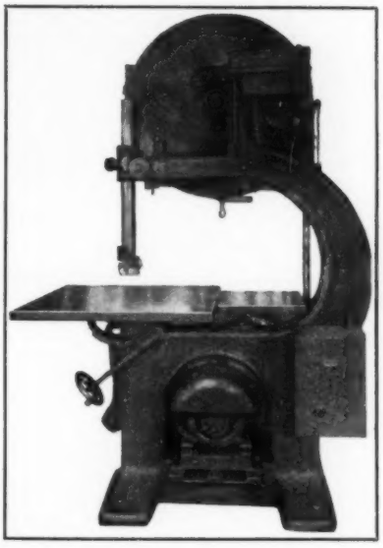
ASSEMBLING MACHINE — *Fabri-Steel Products, Inc., Kerr Machinery Bldg., Detroit, Mich.* This special machine sets "Fast-On" lock nuts where large-scale production is required. Nuts are fed from a continuous rotating hopper to an anvil where they are locked into place. Machine has a speed of 200 r.p.m. and, on assembly of small parts, it is claimed that 2,500 lock nuts easily can be set per hour. Vol. 84, p. 554.



PIPE THREADER—*William K. Stamets, 4026 Jenkins Arcade Bldg., Pittsburgh, Pa.* Consisting of two opposed threading machines and electrically operated mill tables which deliver pipe, convey and position it alternately for two threading operations, and discharge it to unloading skids, this automatic pipe threading machine is electrically synchronized and interlocked. Threading feed is by accurately ground lead screw geared to the spindle and having provision for change to any desired pitch of thread. Vol. 84, p. 348.



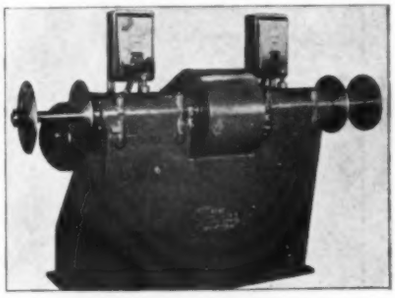




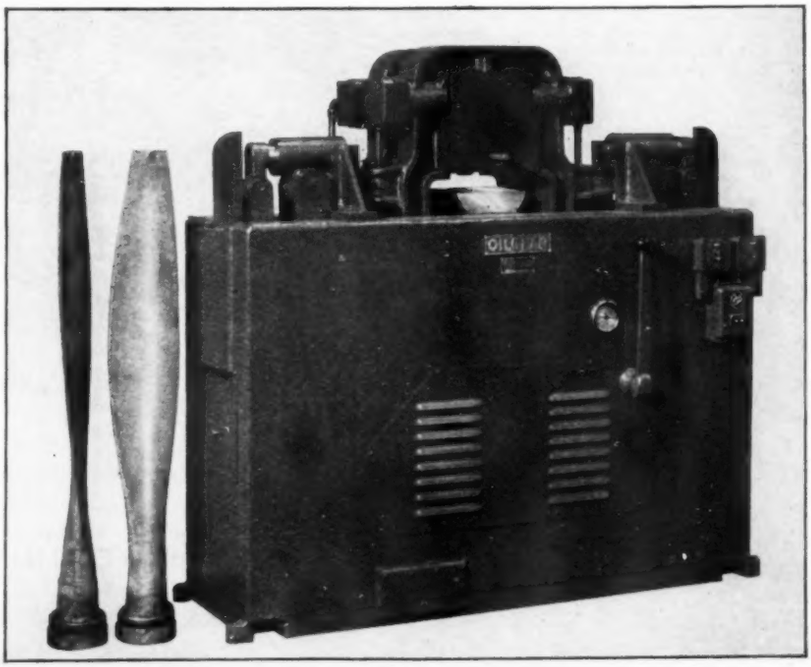
DRILL GRINDER—*Pratt & Whitney Div., Niles-Bement-Pond Co., West Hartford, Conn.* This machine for sharpening deep hole drill tips will take drills from $\frac{1}{8}$ to $\frac{5}{8}$ in. diameter. Roughing, finishing, and general purpose wheels are driven by a 1/3-hp. motor. Coolant system is provided. Dressing diamond, which is mounted on a rocker, can be swiveled about the elevating shaft and bound in the desired position. Vol. 84, p. 515.

DIE FINISHING EQUIPMENT—*Carboloy Co., 11149 E. Eight Mile Road, Detroit, Mich.* Equipment for finishing and servicing Carboloy drawing dies for producing special shapes of bar and rod permits users to employ such dies economically for short as well as long runs. Equipment consists essentially of a die-bearing sizing machine, a die shaping machine, a hand polishing tool and an adaptation of a bench shaper for machining the required laps. All three machines have the same basic action—a short high-speed reciprocating stroke. In all cases an electric motor drive actuates an eccentric which in turn imparts a reciprocating motion to the vertical spindle. Vol. 84, p. 992.

BANDSAW—*Tannewitz Works, Grand Rapids, Mich.* Hazards of broken blades whipping around is said to be completely eliminated in this high-speed bandsaw, in which two hydraulic brakes automatically bring both wheels to a stop the instant a break occurs. In normal operation both wheels may be stopped instantly without throwing undue strain on the blade. Vol. 84, p. 642.

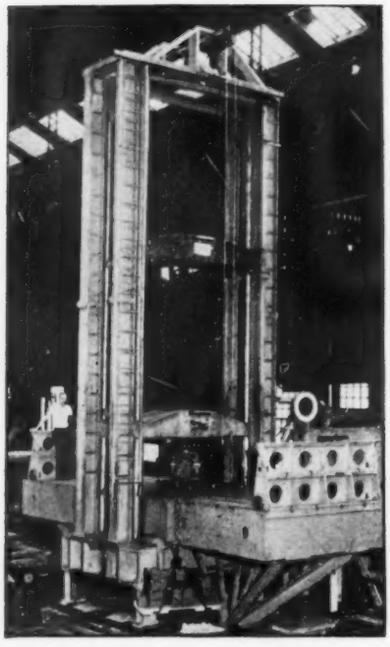


POLISHING LATHE—*Rome Machinery Sales & Engineering Co., 627-35 Webster St., Rome, N. Y.* Model THMO heavy-duty two-motor double-spindle polishing and buffing lathe is well adapted to the slow-speed loose-abrasive method of finishing. Machine illustrated is equipped with two 10-hp. totally inclosed fan cooled ball bearing motors and pushbutton operated magnetic starting switches. Motors up to 25 hp. can be accommodated. Spindles will carry 18 to 36-in. diameter, 8-in. face wheels with 2-in. arbor holes. Vol. 84, p. 591.



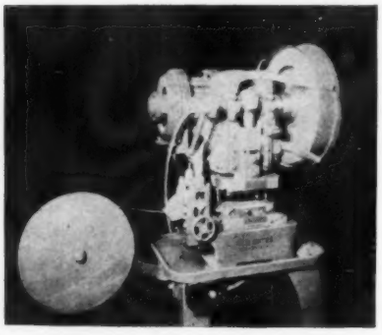
PROPELLER TWISTING MACHINE—*Oilgear Co., 1302-A W. Bruce St., Milwaukee, Wis.* This improved fluid-power variable-speed propeller twisting machine is adapted for twisting 7 to 14 in. wide airplane propeller blades to correct inaccuracies in pitch. It permits the blades to be forged very nearly to the finished size so that only a small amount of stock need be removed during machining. It will maintain the axis of the twist upon the longitudinal center line of the work piece. Machine makes twists between various lengths, and operates in either direction. Simple pushbutton control of the hydraulic clamp is provided. Machine has a normal torque of 530,000 in.-lb. and provides a twisting movement of 24 deg. (12 deg. either side). Vol. 84, p. 516.

MACHINE TOOLS—Miscellaneous Machines



TESTING MACHINE—*Riehle Testing Machine Div., American Machine & Metals, Inc., East Moline, Ill.* A 100-ton materials testing machine is capable of indicating values with an error of 0.06 per cent while exerting test pressures of 700,000 lb. Machine measures 34 ft. in height, 21 ft. in width, and 24½ ft. from front to back. Transverse table is over 8 ft. wide. Vol. 84, p. 941.

EMBOSSING MACHINE — *H. O. Bates, 245 N. Broad St., Elizabeth, N. J.* Developed for aluminum number tags, this improved power embossing outfit can be used for marking tags or nameplates in quantities. Press operates at 125 strokes per min. Vol. 84, p. 225.



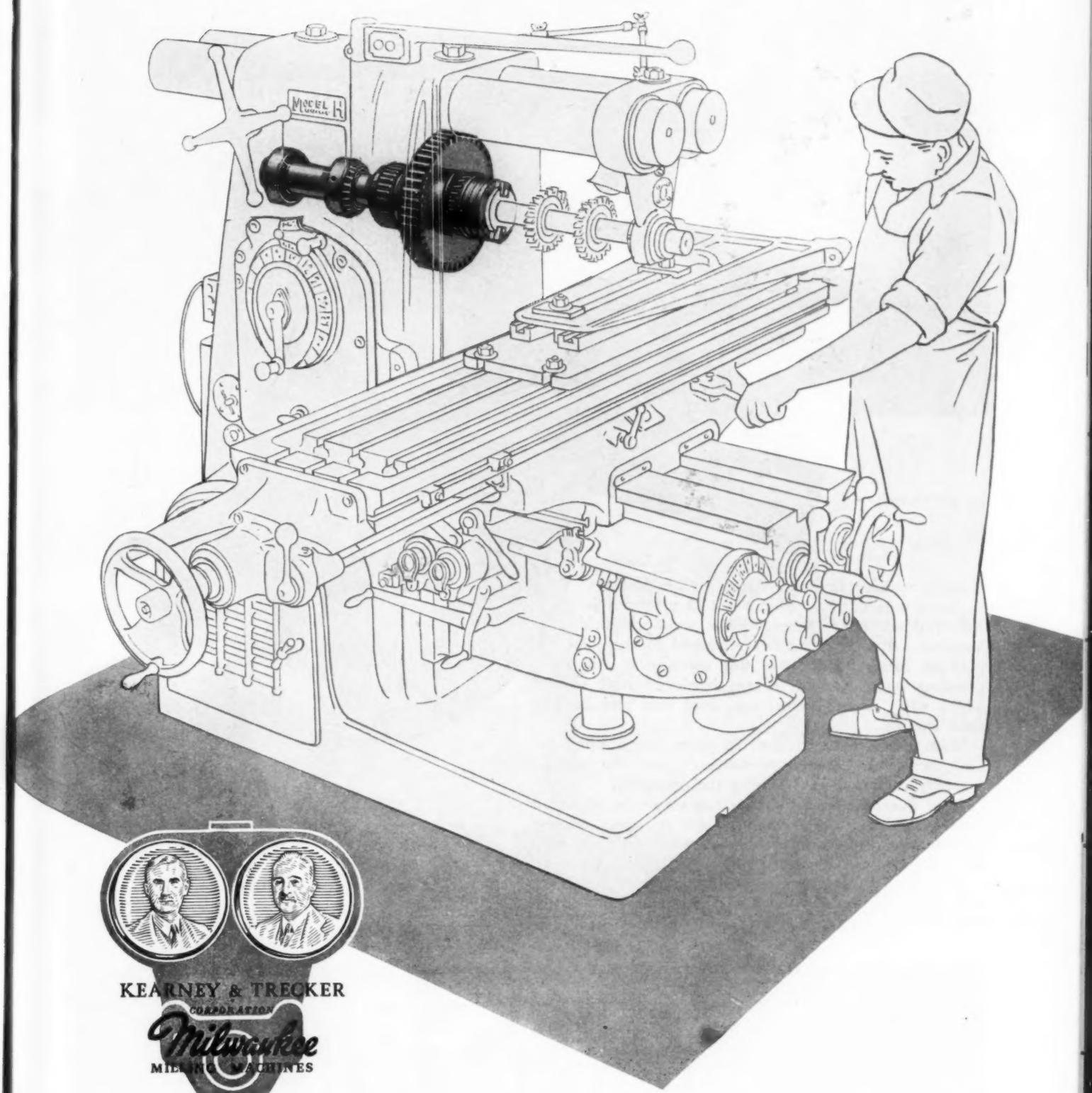
PRECISION MARKER — *Noble & Westbrook Mfg. Co., 20 Westbrook, East Hartford, Conn.* Work pieces up to 6 in. diameter can be held on the No. 98 rapid precision marking machine by using pressure dials of the proper size. This machine was designed for marking pieces that can be placed on end, such as bushings, socket wrenches, spark plug shells, small explosive shells, and similar articles. Vol. 84, p. 262.

NIBBLING MACHINE—*Andrew C. Campbell Div., American Chain & Cable Co., Bridgeport, Conn.* No. 250 nibbling machine features adjustable stroke, wide stock cutting, and three speeds. It is capable of cutting up to ¼-in. mild steel and $\frac{3}{16}$-in. stainless steel in widths up to 70 in. Throat depth of the unit is 36 in. Speeds of 350, 500 and 800 r.p.m. are provided by a V-belt drive. Vol. 84, p. 806.

WELDING ROD FEEDER—*Moslo Machinery, Inc., 5005 Euclid Ave., Cleveland, Ohio.* This welding rod hopper feeding machine passes straightened and cut welding rods into an extrusion press for application of coating material. A capacity of about 500 lb. of rods is provided. It is possible to feed from the smallest to the largest diameter rods without fear of interrupted flow because of misalignment. Speed is controlled through an adjustable Reeves drive. Feeder is supplied in three hopper sizes to take wire up to 18, 24 or 36-in. lengths. Vol. 84, p. 940.

Addition of the center bearing on the spindle of Milwaukee Milling Machines reduces by one-half the distance between bearings and thus increases rigidity 8 times—(shaft deflection varies as the cube of the distance between bearings.)

KEARNEY & TRECKER CORPORATION • Milwaukee, Wis., U. S. A.

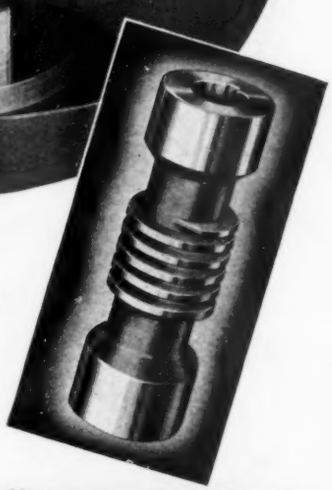


KEARNEY & TRECKER CORPORATION
Milwaukee
MILLING MACHINES

MILWAUKEE MILLING MACHINES

This ARTER combines

SIMPLICITY OF OPERATION
EXTREME PRECISION
and
INCREASED OUTPUT



● Small wonder that this Arter Rotary Surface Grinder—one of three Model A-1-12 machines in the Fellows Gear Shaper plant at Springfield, Vermont—is reported as being "suited to the job."

Work being handled on this machine is that of grinding both ends of a case hardened steel worm which when finished must run dead true and be free from chatter.

With this Arter-in Action, 16 pieces are finished per hour, which is "double production" over the method formerly employed for handling the operation.

Arter Rotary Surface Grinders can always be depended on to save time, improve finish, and cut costs, because they are designed for fast, close tolerance work, are rigid in construction and remarkably simple in operation.

Why not let our engineers study our grinding problem and show you how Arter Rotary Surface Grinders can be suited to your job of getting out more and better work.

●

Write for detailed specifications on Arter Rotary Surface Grinders—available in Light Series Type in 8" and 12" sizes and in a Heavy Type in 12" and 16" sizes. Hydraulically operated models in capacities from 16" to 40".

●

ARTER
GRINDING MACHINE CO.
Worcester, Mass., U.S.A.

SIDNEY

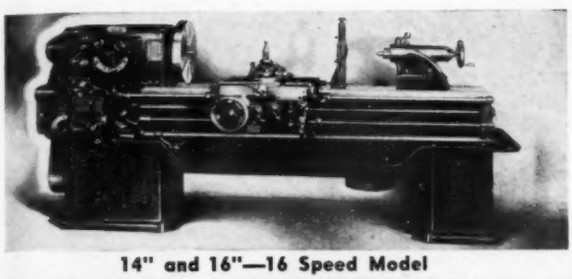
THE SIDNEY MACHINE TOOL CO., SIDNEY, OHIO, U.S.A.

. . . A NAME IDENTIFIED WITH COUNTLESS INCREASED PRODUCTION PERFORMANCES . . .

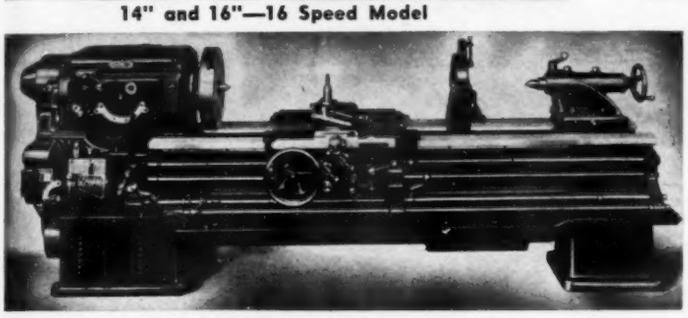
. . . and here's WHY!

SIDNEY LATHES are designed and built to meet today's demand for all EMERGENCY REQUIREMENTS

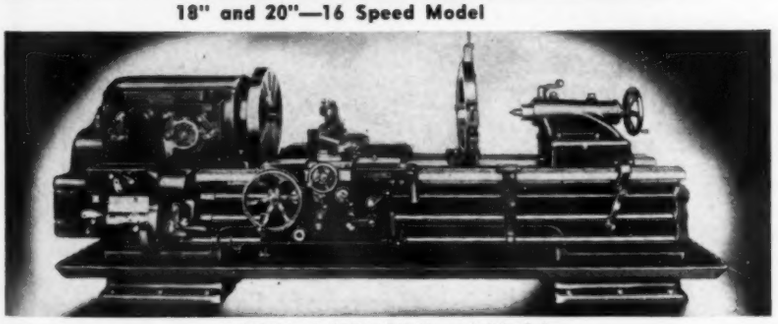
8-12-16 SPEED HEADSTOCKS 14 TO 36 INCH SIZE RANGE



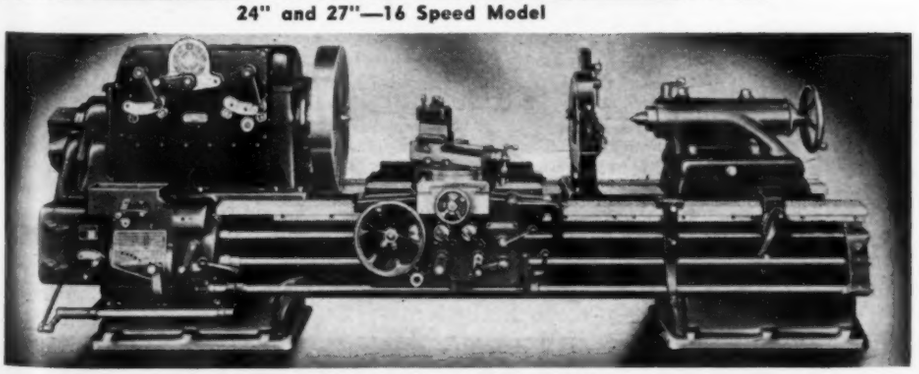
14" and 16"—16 Speed Model



18" and 20"—16 Speed Model



24" and 27"—16 Speed Model



30" and 36"—16 Speed Model

Featuring

- 16-Speed, continuous tooth, herring-bone geared Headstock.
- Center bearing on Spindle and intermediate shaft.
- 48 Thread and Feed changes.
- Force feed lubrication to Headstock. Oil constantly filtered.
- Force feed lubrication to Apron mechanism, Carriage and bottom slide.
- Spindle mounted on Timken Precision roller bearings.
- Anti-friction bearings on all bearings in Headstock, End Gearing, Gear Box and Apron.
- Anti-friction bearings in head-screw, Feed Rod, Cross-feed Screw, Compound Screw, Tailstock Screw.
- Twin Disc driving clutch and brake.
- Double wall Apron with anti-friction bearings.
- Four wall bed with cross girts.
- Four wall, enclosed Gear Box.
- Neoprene wipers on Carriage.
- All gears and shafts of alloy steel, heat-treated and accurately machined.

The SIDNEY MACHINE TOOL Company

SIDNEY U.S.A. OHIO

P&J

THE PIONEER MANUFACTURER OF AUTOMATIC CHUCKING EQUIPMENT

for over 40 years . . . . . .

Leaders in the field of PARTS PRODUCTION

Potter & Johnston has taken the lead for many years in meeting and solving the problems involved in producing duplicate parts accurately. As demands for larger quantities and higher quality have been made, P.&J. has developed the machines to meet them.

Potter & Johnston Factory Representatives are available in all metal-working industrial areas to render prompt and efficient service in helping you improve your production efficiency, speed up work and save you money.

POTTER & JOHNSTON MACHINE CO.

PAWTUCKET, PHODE ISLAND

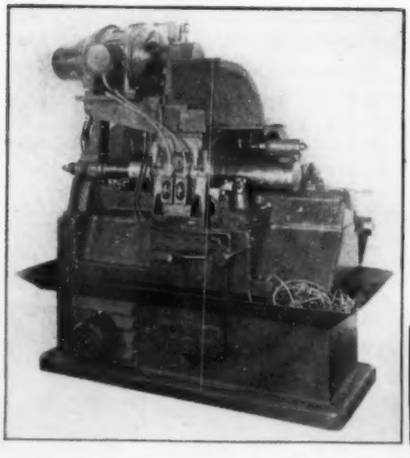
COULTER

1941 MACHINES for DEFENSE and HIGH PRODUCTION PURPOSES

SPECIAL CARTRIDGE CASE FINISHING MACHINES *Fast and Versatile . . .*

Facing, contour boring, drilling, reaming, open end trimming to length and chamfering inside and outside are all automatically controlled on this Coulter machine. Separate tool slides at each end of the machine make it possible to perform these operations simultaneously.

This machine is remarkably fast and will machine 5-in. cases in 25 seconds. Loading time is from 5 to 7 seconds.

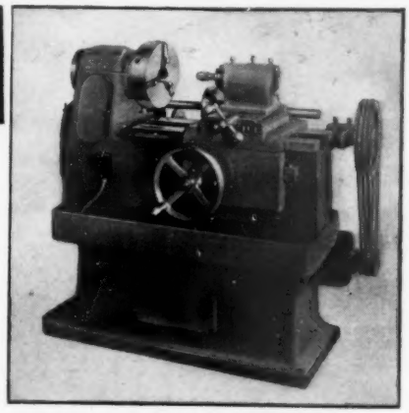


Features include complete motor drive, with motors equipped with brakes to reduce coasting time. Cam feed shaft is arranged for hand operation to facilitate tool adjustments.

Detailed specifications available on request.

HOB THREAD MILLING MACHINE

•



Featuring Camshaft Control

The Coulter Type H Thread Miller is semi-automatic in operation. Pick off gears provide speed and feed variation for various diameters.

The machine is substantially built for long hard service, with bed mounted on base enclosing lubricant tank. Work spindle has a 4 in. hole and a suitable flanged end on which a universal chuck, a master collet chuck or fixtures may be mounted. The large milling spindle is provided with taper bearings for take-up adjustment and is worm driven direct from motor.

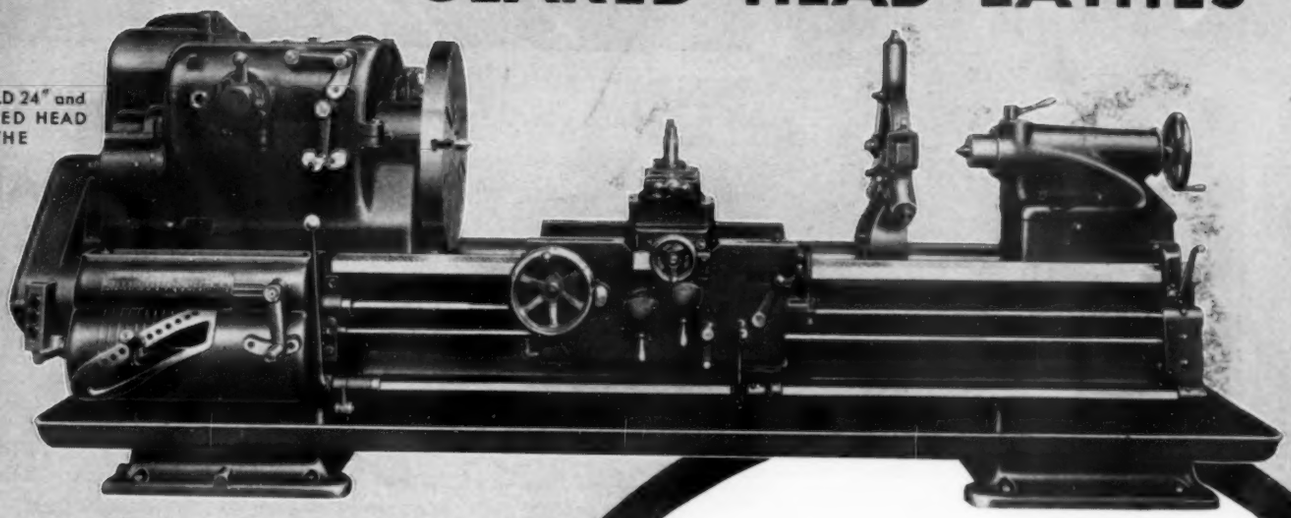
An important feature is camshaft control, which makes it necessary merely to set the hob to suitable depth on the first piece, after which duplication is assured without manual adjustments. Length of bed, 52 in.; swing over carriage, 14 in.; maximum external thread, 7 in. Complete detailed specifications available on request.

JAMES COULTER MACHINE CO.

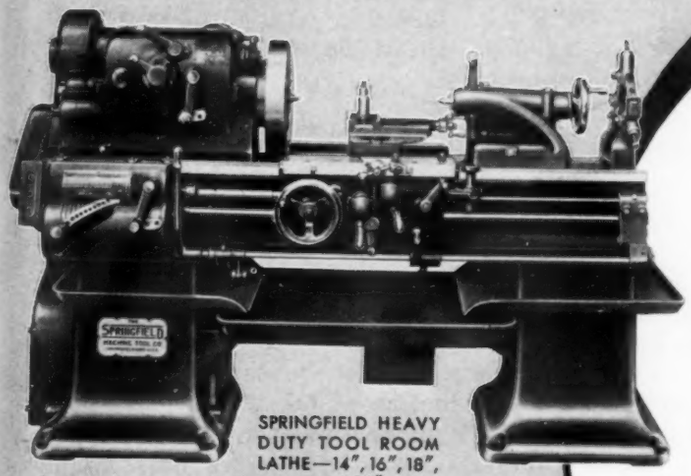
BRIDGEPORT, CONN.

SPRINGFIELD...

GEARED HEAD LATHES



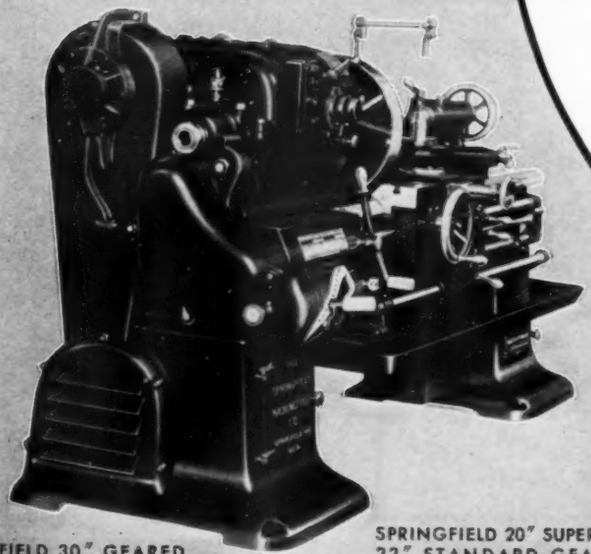
SPRINGFIELD 24" and 27" GEARED HEAD LATHE



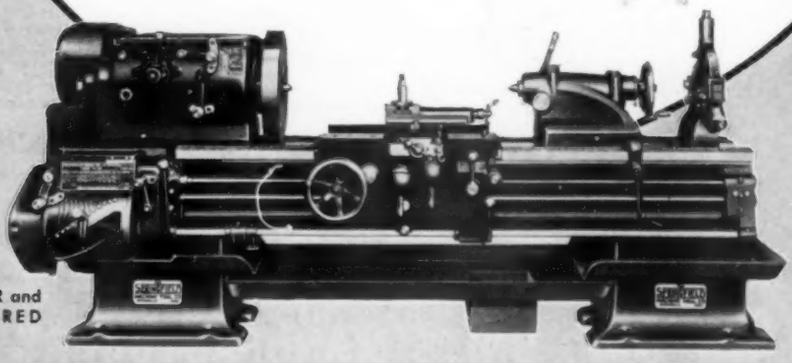
SPRINGFIELD HEAVY DUTY TOOL ROOM LATHE—14", 16", 18", and 20"

. . . ARE "SETTING THE PACE" WHERE HEAVY PRODUCTION SCHEDULES ARE IN FORCE!!

Wherever defense or domestic orders are straining productive capacity to the utmost, Springfield Geared Head Lathes are "setting the pace". Technical innovations in design and construction, plus painstaking craftsmanship from headstock to tailstock, mark Springfields as the ideal unit for accurate work under high production pressure. And so it is that now, when every ounce of productive ability must be squeezed from each of your units, we urge you to investigate the complete Springfield line . . . let them show you how they can become "production pace setters" in your plant. With a range of sizes from 14" to 30", both heavy and medium duty, Springfield Geared Head Lathes are ideally suited to work for you in adding to the quality and quantity of your output. Write us for further details.



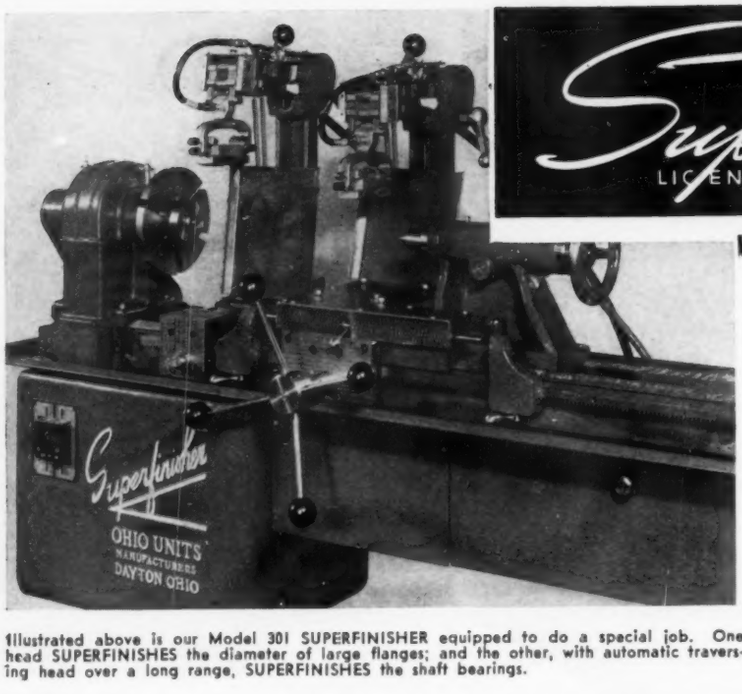
SPRINGFIELD 30" GEARED HEAD LATHE—MEDIUM DUTY



SPRINGFIELD 20" SUPER and 22" STANDARD GEARED HEAD LATHE

THE SPRINGFIELD MACHINE TOOL COMPANY

SPRINGFIELD, OHIO, U.S.A.



OHIO UNITS *Superfinisher*

LICENSED BY CHRYSLER

Illustrated above is our Model 301 SUPERFINISHER equipped to do a special job. One head SUPERFINISHES the diameter of large flanges; and the other, with automatic traversing head over a long range, SUPERFINISHES the shaft bearings.

SPEEDING UP *for* THE JOBS AHEAD

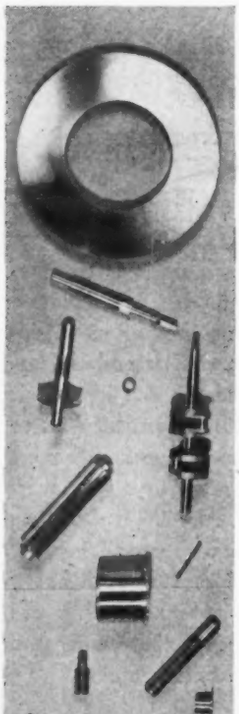
• • • •

PRECISION SURFACES

• • • •

Fine precision surfaces can be obtained in minimum time by the application of SUPERFINISHING. These machines have been developed for the jobs that you now have, or will have to speed up your production program.

The machines are unique in design in that so many types of work can be done on the same tool. It is a self contained unit with driving motor, lubricating system and the various multi-motions involved in SUPERFINISHING incorporated in a single unit. SUPERFINISHING heads may be adjusted to any desired position, and the tension of the stones against the work is controlled by a unique spring device adjustable for both internal and external work.



The above unretouched photograph illustrates some of the large variety of parts which can be SUPERFINISHED on these machines.

ADAPTABLE TO A WIDE VARIETY OF WORK . . . A HIGH PRODUCTION MACHINE TOOL

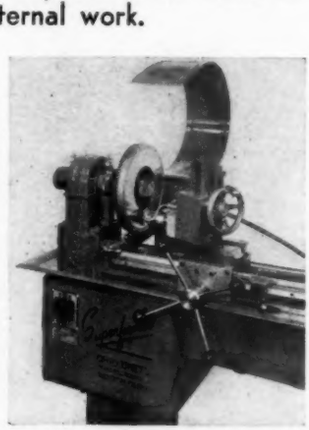
This machine for SUPERFINISHING round, flat, external and internal surfaces, has been developed for general use. The illustration to the left will show a wide variety of parts that can be SUPERFINISHED without expensive or extensive set-ups.

FOR AVIATION PARTS — TANK PARTS and, in fact, all other parts that require a fine surface finish, this machine functions almost universally.

Single heads, multiple heads, flat surfacing heads and other types of equipment make this a universal type of machine whereby we can equip it to meet your requirements for high production.

SUPERFINISHING is desirable in all lines of industrial activity.

SEND US YOUR BLUEPRINTS OR BETTER STILL SEND US SAMPLES TO BE SUPERFINISHED



The above photograph shows the clutch contact face and the oil seal at the rear of a flywheel being SUPERFINISHED. Eleven different types of flywheels are SUPERFINISHED with this one setup by one manufacturer.

We also manufacture the **OHIO UNITS MULTIPLE CAM GRINDER** which fits on practically any type of cylindrical grinder, for producing various cam shapes to precision limits on a production basis.

OHIO UNITS MANUFACTURERS • DAYTON, OHIO, U. S. A.

FREE INFORMATION FOR YOUR METAL-WORKING LIBRARY

New Catalogs, Booklets, Bulletins

METAL-WORKING EQUIPMENT

1 SURFACE GRINDERS — Hill Acme Co., Cleveland, O. 6-page folder illustrates and describes line of heavy duty precision surface grinders in both horizontal and vertical spindle types. Specifications and complete details.

2 TURRET LATHES—Morey Machinery Co., Inc., New York City. 8-page Circular 629 has large illustrations of No. 2 plain head and No. 2T geared head turret lathes. Diagrams show construction. Features described.

3 LATHES—South Bend Lathe Works, South Bend, Ind. 12-page catalog 16T illustrates new 16-inch series "S" lathes in tool room, quick change gear, and standard change gear types. Details on various drives and sizes available. Attachments and features of construction given in detail.

4 DRILL PRESSES—Delta Mfg. Co., Milwaukee, Wis. 4-page folder on drill presses. Available in sizes from a single spindle to drill presses a block long. Features machines built to job. Diagrams.

5 SAWS—Porter-McLeod Machine Tool Co., Inc., Hatfield, Mass. 4-page folder illustrates new 8 inch Porter-McLeod cold metal sawing machine with complete descriptive material on construction and a chart showing capacities. Sawing accessories offered.

6 HOBBING MACHINES—Barber-Colman Co., Rockford, Ill. Illustrated folder on Type T Taper Spline Hobbing Machine outlining in detail features, specifications and uses.

7 METAL SHAPING MACHINES—Continental Machines Inc., Minneapolis, Minn. 56-page catalog describes in detail Doall Contour metal shaping machine. Covers line of Doall models for continuous sawing, filing, and polishing. Available in various sizes and capacities for all industries. Gives prices and sizes on contour saws, file bands and various accessories. Valuable reference.

8 GEAR CUTTING MACHINES—Michigan Tool Co., Detroit, Mich. Series of 4-page illustrated folders describing in detail latest models of gear cutting, gear lapping, gear checking and hob checking equipment. Valuable information on machines available for these operations.

TOOLS AND ACCESSORIES

9 PYROMETERS—Leeds and Northrup Co., Philadelphia, Pa. 28-page catalog E-33A-503 describes apparatus for checking thermocouple pyrometers in plant and laboratory. Recommendations for checking thermocouple pyrometers and portable equipment for tests under actual operating conditions with laboratory apparatus to standardize it. Information for choosing checking apparatus best fitted to need given in detail.

10 METAL CUTTING SAWS—Capewell Manufacturing Co., Hartford, Conn. 14-page catalog 140 gives specifications and prices on Technite Molybdenum High Speed, High Speed, Tunghard, Tungflex and Flexloy hack saw blades and on Capewell flexible metal-cutting, spring temper metal-cutting and wood-cutting band saws. General information to aid selecting proper saws for the job.

11 PYROMETERS—Brown Instrument Co., Philadelphia, Pa. Catalog 15E on indicating, recording and control millivoltmeter pyrometers with large, clear photographs. Constructional features and operative advantages fully described.

12 GRINDING WHEELS — Carborundum Co., Niagara Falls, N. Y. 79-page booklet is an invaluable reference for all users of grinding wheels. Complete data on all important factors influencing selection of grinding wheels and information on wheels to be used under all types of conditions. Details on individual operations and data on construction of wheels. Charts make correct selection of wheels simple and rapid. A complete guide.

For Your Convenience

Two business-reply cards are printed here. On each is room for you to request four pieces of literature.

How to Order

1. If you are requesting four pieces or less, please use only the bottom card. Likewise, for five to eight pieces, use both cards.

2. Be sure to fill one space for each piece you order. This will assure your receiving copies of literature promptly by reducing clerical work in handling your requests.

3. When you have filled out one space for each catalog or bulletin you want, detach along the scored lines and drop the cards in the mail. No postage is required.

Example

Write in circle number of item describing one catalog wanted → (23)

Name Eugene H. Roderick

Address 1243 E 7th St.

Brooklyn, New York Title Supt.

Company W. C. Dow Mfg. Co.

AMERICAN MACHINIST, New York. 1-8

These cards not good after May 1, 1941

Write in circle number of item describing one catalog wanted →

Name

Address

Title

Company

AMERICAN MACHINIST, New York. 1-22

Write in circle number of item describing one catalog wanted →

Name

Address

Title

Company

AMERICAN MACHINIST, New York. 1-22

Write in circle number of item describing one catalog wanted →

Name

Address

Title

Company

AMERICAN MACHINIST, New York. 1-22

Write in circle number of item describing one catalog wanted →

Name

Address

Title

Company

AMERICAN MACHINIST, New York. 1-22

Write in circle number of item describing one catalog wanted →

Name

Address

Title

Company

AMERICAN MACHINIST, New York. 1-22

Write in circle number of item describing one catalog wanted →

Name

Address

Title

Company

AMERICAN MACHINIST, New York. 1-22

Write in circle number of item describing one catalog wanted →

Name

Address

Title

Company

AMERICAN MACHINIST, New York. 1-22

Write in circle number of item describing one catalog wanted →

Name

Address

Title

Company

AMERICAN MACHINIST, New York. 1-22

13 CEMENTED CARBIDE TOOLS—Carboloy Co., Inc., Detroit, Mich. 12-page profusely illustrated catalog tells how production was speeded up at Monarch Machine Tool Co. Details and diagrams of just where cemented carbide tools were used and how they more than doubled production for Monarch described. Interesting and valuable case study.

HEAT-TREATING AND WELDING

14 ARC WELDING—Air Reduction Sales Co., New York City. 89-page cloth-bound course on Arc Welding. Designed to be a textbook on subject from the most elementary safety precautions to the most difficult phases of welding. Included with this is a 100-page exercise book diagramming each step and showing right and wrong ways with practical lessons. These two books combine to make a complete course. A rare offer for production men and welders desiring complete information on arc welding.

15 OXYACETYLENE WELDING AND CUTTING PROCESSES—Air Reduction Sales Co., New York City. 94-page cloth-bound textbook of instructions in oxyacetylene welding and cutting processes. Supplemented by cloth-bound series of work sheets on its use. These together comprise a complete course, discussing all factors and describing actual use in a variety of materials and operations. Invaluable to those using or considering use of this process.

16 ARC WELDERS—Emerson Electric Mfg. Co., St. Louis, Mo. 8-page catalog X-3896 on Emerson-Electric Arc Welders. Illustrates and describes construction features, performance, specifications, and prices for all four models. Range of uses, approximate operating costs, manufacturers' tests and description of accessories included.

17 DIE HARDENING FURNACES—Westinghouse Electric and Mfg. Co., E. Pittsburgh, Pa. 6-page illustrated folder on new Westinghouse Furnace for bright hardening die blocks without oxidation, distortion, decarburization or cracking. Gives details, specifications and advantages. Charts show steels for Ammogas hardening and results.

18 WELDING STAINLESS STEEL—Ingersoll Steel and Disc Div., Borg-Warner Corp., Chicago, Ill. 16-page booklet, "Manual of Welding and Fabricating Procedures for IngAclad Stainless Clad Steel." Describes recent advances in methods of fabricating and welding stainless clad steel for assuring maximum strength, corrosion resistance and ductility in welded fabrication. Chart shows corrosion resistance of IngAclad to corrosive elements. Forming, bending, welding, heat-treating, cleaning, grinding and polishing of stainless clad steel covered.

19 SPOT WELDERS—Acme Electric Welder Co., Huntington Park, Cal. 4-page bulletin 53 describes and illustrates Acme line of spot welders with complete specifications and distinctive features. Lifetime guarantee against defects in material or workmanship. General capacity information.

20 A. C. WELDERS — Westinghouse Electric and Mfg. Co., E. Pittsburgh, Pa. 4-page illustrated bulletin on "Midget Marvel Flexarc" A.C. Welder. Outstanding features and internal construction explained. Comprehensive list of applications of A.C. welding in industrial field with operating costs and charts of power costs in cents per hour. Page devoted to answers of commonly asked questions about A.C. welding.

CLEANING AND FINISHING

21 ROCKER BARRELS — Pangborn Corporation, Hagerstown, Md. 38-page bulletin 213 on "Pangborn" ROTO-BLAST Rocker Barrels"; describes operations of cleaning gray iron, steel, semi-steel malleables, forgings, plate, brass, alloy, bronze and other castings, heat-treated and metal parts, by the Airless ROTOBLAST method. Capacities and advantages of two new model sizes discussed.

22 METAL CLEANING—Oakite Products, Inc., New York, N. Y. 31-page booklet on the cleaning of metals before electro-plating. Describes in detail modern Oakite materials and methods for economical performance. Authoritative text on the subject with illustrations showing before and after effects.

PARTS AND MATERIALS

23 MACHINING AMPCO METAL — Ampco Metal, Inc., Milwaukee, Wis. 4-page engineering data sheet covers machining of this aluminum bronze alloy. Illustrates with diagrams showing correct methods for drilling, reaming, tapping, milling, and grinding.

24 MACHINING ALLOY DIE CASTINGS—The New Jersey Zinc Co., New York, N. Y. Authoritative 32-page book on "Practice in Machining Zinc Alloy Die Castings." Gives exact information on metal-working processes used on these castings, and illustrated with photographs of practical commercial fixtures, contributing to expansion in use of zinc alloy die castings. Valuable reference.

25 LEATHER BELTING — Alexander Bros., Philadelphia, Pa. 24-page booklet on line of leather belting and leather products with complete illustrations and specifications on various types of belting. H.P. ratings for flat leather belting given and belt speeds for round leather belting. Valuable drive information and installation views.

26 MOTOR CONTROLS—Cutler-Hammer, Inc., Milwaukee, Wis. 35-page booklet illustrates and describes development of motor controls and shows details of Unitrol construction. Built to operating needs and floor-space requirements, providing valuable space economy, and flexibility to meet changing requirements. Of interest to motor control users.

27 BEARINGS—Link-Belt Co., Chicago, Ill. 88-page data book 1775 on Link-Belt "Friction Fighter Bearings." Describes free-turning rollers with complete table of sizes, dimensions, weight and prices. Load ratings and minimum life expectancies. Information on selection of proper unit for individual need and miscellaneous engineering data.

28 MOTOR STARTERS—General Electric Co., Schenectady, N. Y. 6-page folder GEA-2964B describes and illustrates construction and advantages of new Size One Magnetic Motor Starter, emphasizing compactness, long-life, simplicity, safety and protection features.

29 GRAPHITE STEELS — Timken Roller Bearing Co., Steel and Tube Div., Canton, O. 16-page catalog discusses line of graph-sil, graph-mo and graph-tung graphitic steels with questions and answers on their uses and performance, with photo-micrographs showing construction, and eight pages of specialized application.

30 BEARINGS — Product of Chrysler Corp., distributed by Boston Gear Works, Inc., North Quincy, Mass. 32-page catalog O-3 on Oilite Oil-Cushion Precision Bronze Bearings and Rough Stock. Catalog lists various stock sizes of plain cylindrical, flanged and thrust type bearings as well as sizes of Oilite in cored bar, solid bar and plate stock form. Engineering data on tolerances, shaft clearances, housing designs, etc. Valuable reference.

31 MOLDING PLASTICS — Bakelite Corp., New York City. 32-page full color booklet describes compression and injection molding processes with differences between thermo setting and thermoplastic molding materials. Physical, mechanical and electrical properties of Bakelite plastics enumerated in editorial and table form for ease in deciding individual advantages.

32 NICKEL ALLOYS—The International Nickel Co., Inc., New York, N. Y. 4-page folder describes high-temperature properties of Inconel Metal and Nickel with illustrations showing its uses and durability. Pictures Inconel's use in airplane exhaust manifolds.

33 TOOL STEEL—Crucible Steel Co. of America, New York, N. Y. "Tool Steel for the Non-Metallurgist". 30 page booklet explains characteristics of different types of tool steels, outlining the purposes for which the different steels are best adapted, and gives suggestions for heat-treatment. Valuable data for those interested in use of tool steel.

34 BEARINGS—Keystone Carbon Co., St. Marys, Pa. 24-page catalog on Selflube Porous Bearings. Illustrated with list of sizes, specifications, code numbers, etc., and showing the advantages of their use.

35 SWITCHES—Micro Switch, Freeport, Ill. Data Sheets No. 14, 8A, 9A on Micro Switches gives information and specifications on roller plunger, limit and explosion proof Micro Switches.

36 GEAR MATERIALS—International Nickel Co., N. Y., N. Y. 16-page bulletin "Modern Trends in Nickel Steel & Cast Iron Gear Materials" gives core properties, machinability, heat-treating of these materials and their alloys in technically valuable form for gear manufacture.

FIRST CLASS
PERMIT No. 10
(Sec. 510, P.L.&R
NEW YORK, N.Y

BUSINESS REPLY CARD
NO POSTAGE STAMP NECESSARY IF MAILED IN THE UNITED STATES

4c. Postage Will Be Paid By—

AMERICAN MACHINIST
330 West 42nd Street
New York, N. Y.

FIRST CLASS
PERMIT No. 10
(Sec. 510, P.L.&R
NEW YORK, N.Y

BUSINESS REPLY CARD
NO POSTAGE STAMP NECESSARY IF MAILED IN THE UNITED STATES

4c. Postage Will Be Paid By—

AMERICAN MACHINIST
330 West 42nd Street
New York, N. Y.

NILES "Time Saver" LATHES

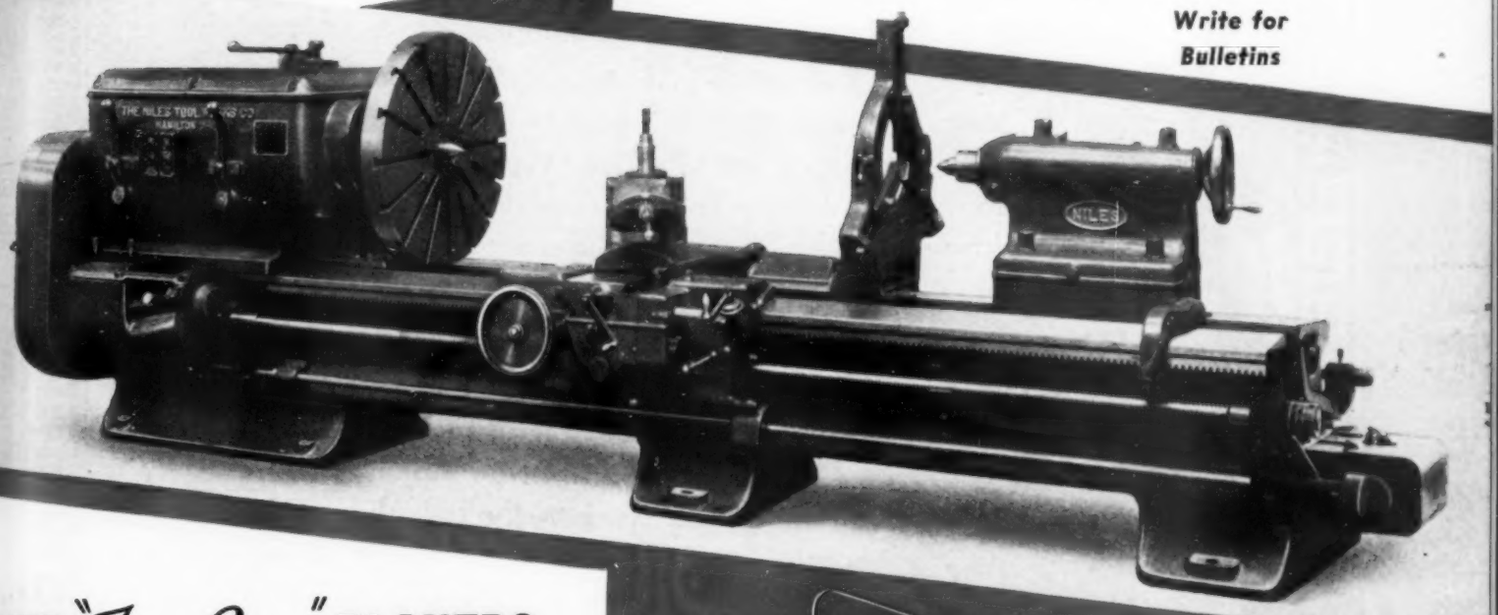
NILES "TIME SAVER" LATHES FEATURE . . .

Power Rapid Traverse for carriage
Single Lever for engaging either feed or Traverse
Compact Apron allows operator to stand close to his work
Sloping Bed Web
Large LeBlond type ways
Positive fine tooth steel Clutches in apron
Heat Treated Maag Gears throughout
Anti-friction Bearings throughout headstock and apron
Mechanical interlock between feed mechanism and leadscrew nut
Multiple "V" Belt Drive

ARE *"IN STEP"* WITH NATIONAL DEFENSE REQUIREMENTS

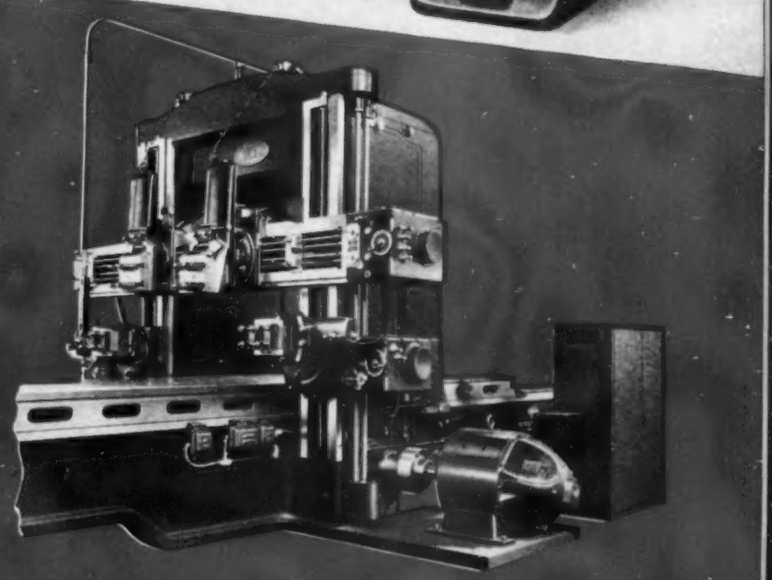
• The urgent demand for high speed, flexible, accurate machine tools to meet the rigid conditions of our National Defense program finds Niles Time Saver Lathes "in step" with these exacting requirements. Just glance over the outstanding features of Niles "Time Saver" Lathes and you will understand why these husky lathes meet the demands for speed, close tolerances and rapid production . . . why they are actually "in step" with modern production requirements.

Write for Bulletins



NILES "Time Saver" PLANERS

Here is another Niles Tool that is doing a remarkable job of meeting production schedules and maintaining accuracy on government contracts. Duplex control, flood lubrication, electric feed and traverse are but a few of the many features of Niles "Time Saver" Planers that will help you to keep "in step" with today's production demands. Write for details.



GENERAL MACHINERY CORPORATION

NILES TOOL WORKS DIVISION

HAMILTON, OHIO

TIME . . .

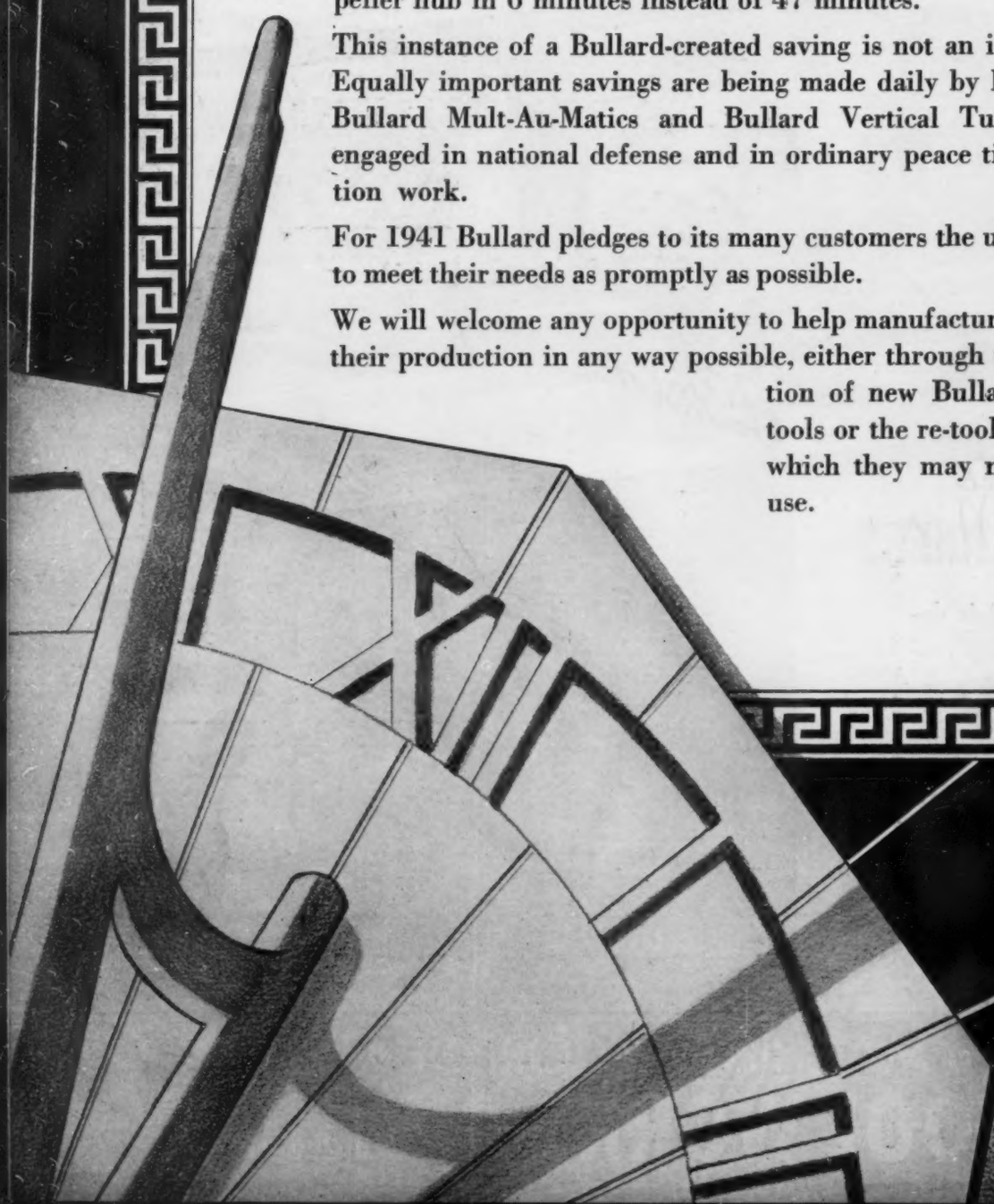
the most valuable thing a man can spend

So said Theophrastus, over 2200 years ago. * * * Today our Country's rearmament program is vividly dramatizing the value of time. Our future may literally depend on such apparently small things as machining an important part of an aeroplane propeller hub in 6 minutes instead of 47 minutes.

This instance of a Bullard-created saving is not an isolated one. Equally important savings are being made daily by hundreds of Bullard Mult-Au-Matics and Bullard Vertical Turret Lathes engaged in national defense and in ordinary peace time production work.

For 1941 Bullard pledges to its many customers the utmost effort to meet their needs as promptly as possible.

We will welcome any opportunity to help manufacturers increase their production in any way possible, either through the installation of new Bullard machine tools or the re-tooling of those which they may now have in use.



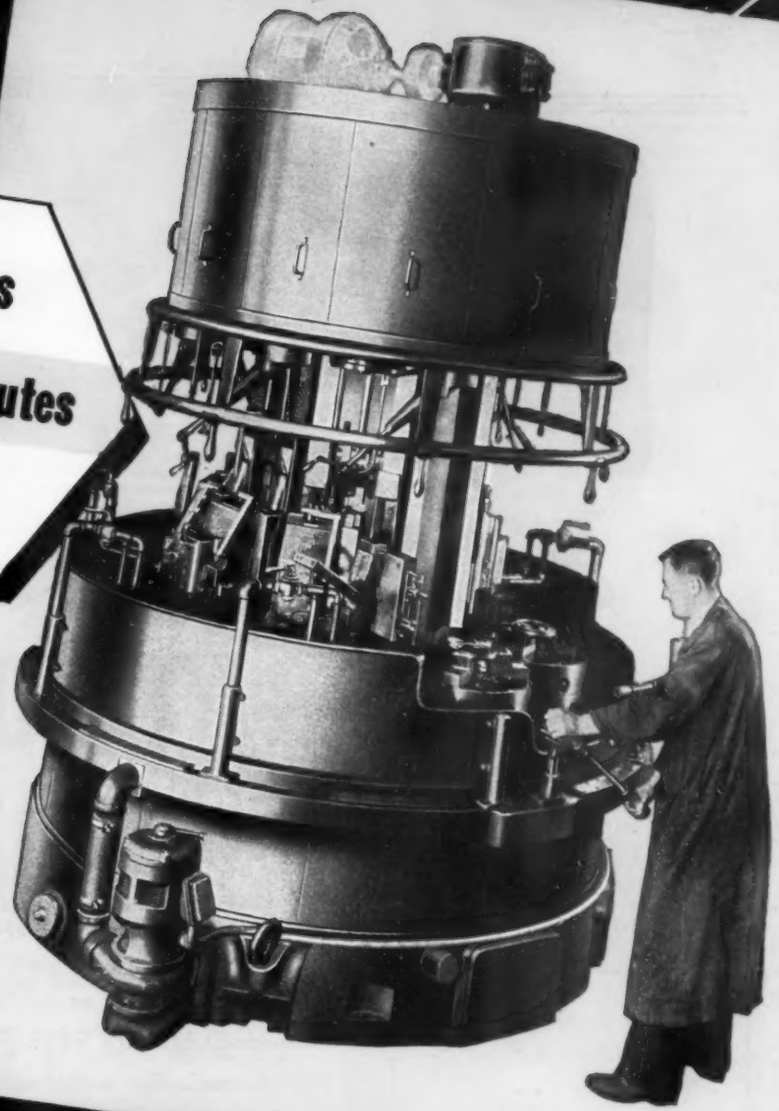
BULLARD

THE B

Old Time --- 47 Minutes

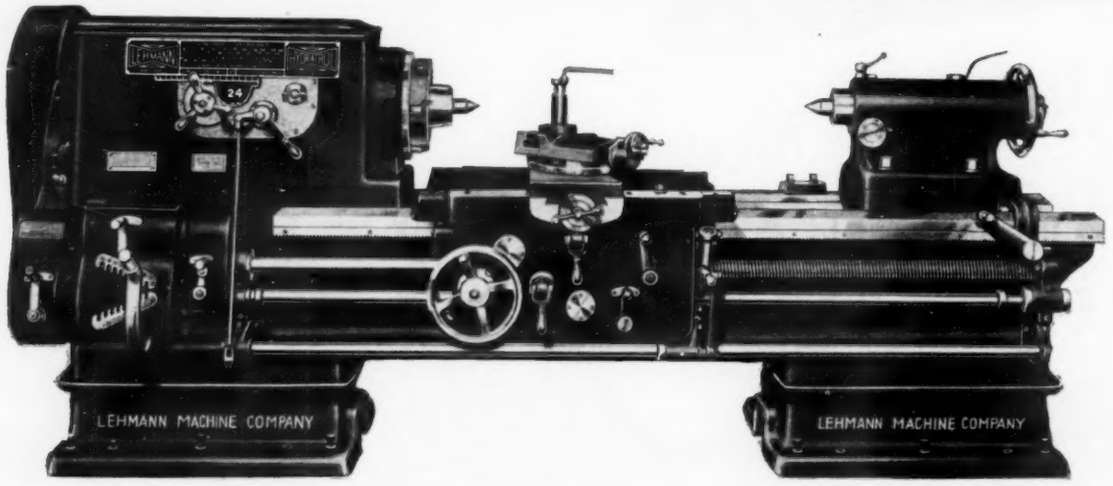
Mult-Au-Matic Time 6 Minutes

SAVED--- 41 Minutes



BULLARD Mult-Au-Matics and Bullard Vertical Turret Lathes have one vital point in common. Each is more than a machine tool — each offers methods of machining with real advantages in speed, in accuracy, and in reliability, which are not shared in by other types of tools. To thoroughly explain those advantages and their application to an individual manufacturer's problem is a task for individual study and personal discussion. Trained Bullard Engineers are at your disposal for this service.

BULLARD COMPANY BRIDGEPORT CONNECTICUT



THE HYDRATROL LATHE . . . .

SIMPLIFIES MANY PRESENT LATHE PROBLEMS . . . . SPEEDS UP PRODUCTION . . . . INCREASES SAVINGS . . . .

The *SLIDE RULE* calculates, indicates, and makes available, instantly, any one of 16 spindle speeds by a simple turn of the operating handle

Modern Features which Meet Modern Production Needs . . .

- Ease, speed, and simplicity of operation
- Unequalled capacity for power transmission
- Freedom from stoppage for adjustments
- Absence of mechanical troubles
- Automatic presentation of essential information
- Automatic and ample lubrication
- Extraordinary hardness of bed

The HYDRATROL is an outstanding development in lathe design offering tremendous capacity for high power requirements; operating simplicity through mechanism which automatically changes speeds, indicates cutting speed of the work in feet per minute and provides pre-determined setting for numbered operations. Automatic control assures safety of positive engaging members.

Backed by 25 years of experience in building high-grade engine lathes, success of the HYDRATROL Lathe was immediately attained. The first HYDRATROL Lathe, sent out in 1935, has been in use 24 hours a day for five years with improvement rather than deterioration in its operation. The users of this lathe have since purchased over a quarter million dollars worth of HYDRATROL Lathes. The performance is characteristic of the HYDRATROL and time in use are proving the value of its features.

Super-refined heavy duty HYDRATROL lathes built in sizes:

16" - 18" - 20" - 22" - 24" - 27" - 30" - 36" 27" large hollow spindle type up to 13 " hole
18" large hollow spindle type up to 7¼" hole 30" large hollow spindle type up to 16 " hole
24" large hollow spindle type up to 12 " hole 36" large hollow spindle type up to 18 " hole

LEHMANN MACHINE COMPANY CHOUTEAU AT GRAND ST. LOUIS, MISSOURI

Bardons and Oliver

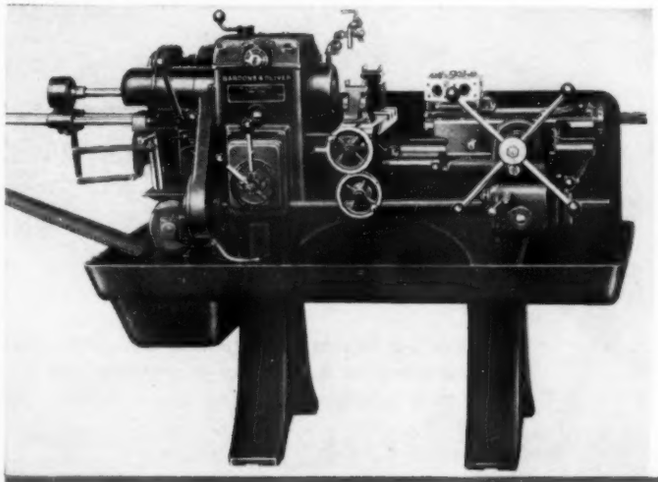
Step up your production and earning power . .

WITH THE

No. 2 Geared Electric Turret Lathe

With the preparedness program calling for increased output, the productive ability of your turret lathes becomes of major importance.

High spindle speeds coupled with instantaneous, effortless start-stop-reverse and quick speed changes through an efficient electric-mechanical control puts the No 2 Geared Electric Turret Lathe way out in front.



Note these prominent features —

SINGLE LEVER CONTROL of six-geared spindle speed changes with direct reading speed dial,

OPTIONAL SPINDLE SPEED RANGES to suit individual requirements,

SINGLE LEVER ELECTRIC START-STOP-REVERSE and SINGLE LEVER ELECTRIC HIGH-LOW SPEED CHANGE with instantaneous, effortless response to the operator's touch,

SINGLE LEVER CONTROL of six feed changes with direct reading feed dial.

In the field of small bar and chucking work this machine is pre-eminent.

BARDONS & OLIVER, INC.
1133 W. 9th STREET • CLEVELAND, OHIO

We build a complete line of ram type turret lathes.

NEW Foster F

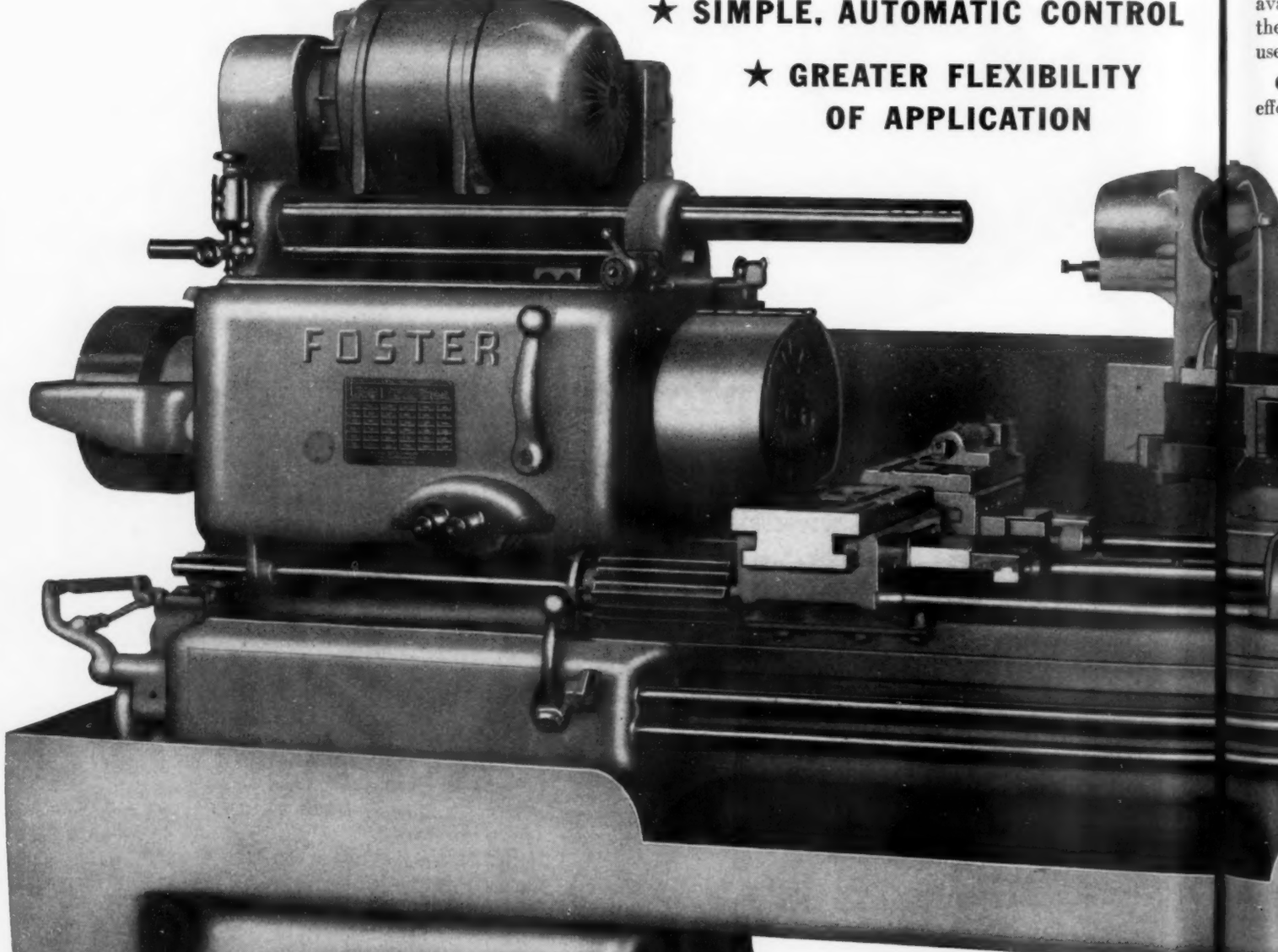
Fill Demand For

★ INCREASED PRODUCTION . . .

★ ULTRA-PRECISION ACCURACY

★ SIMPLE, AUTOMATIC CONTROL

★ GREATER FLEXIBILITY OF APPLICATION



New 1-F Foster Fastermatic Chucking Machine. Fastermatics are made in several capacities in either turret or platen type.

FOSTER MACHINE COMPANY
ELKHART, INDIANA

Fastermatics

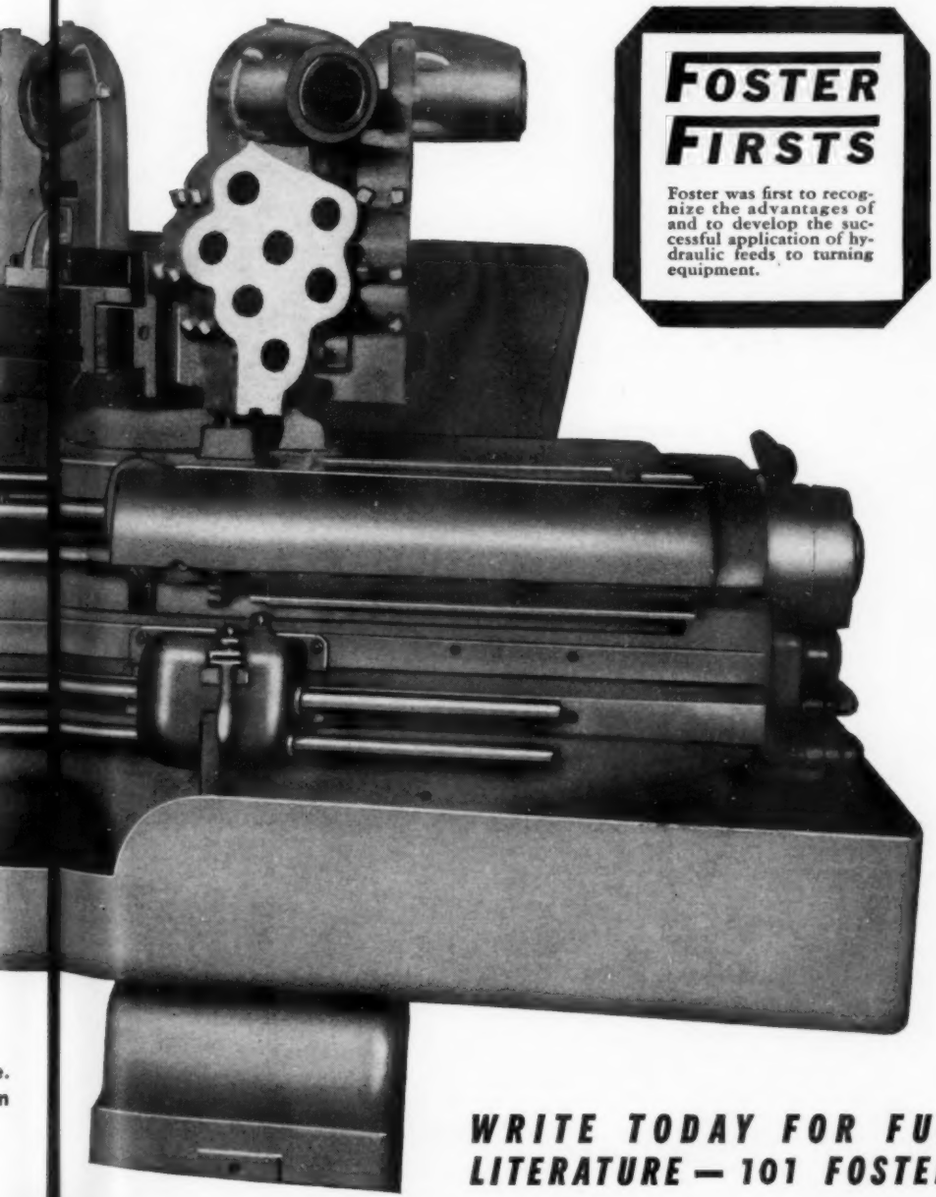
● Fastermatics are modern precision automatic turret lathes with hydraulic feeds. Each turret face has an individual adjustable feed, any part of the movement of which can be automatically converted into a rapid traverse for greater *time conservation.*

With hydraulically actuated feeding mechanism, no less than 75% fewer parts are needed than on similar machines using gear or screw feeds, and a far greater range of feeds is available. In addition, the hydraulic cushions and protects the tool while affording the maximum cut for the medium used—*additional saving.*

One operator can handle several Fastermatics with less effort than is required for a regular universal turret lathe. The automatic features assure steady, maximum output all day long, as production is unaffected by operator fatigue or inefficiency. One operator handling several Fastermatics *reduces operating cost.*

Production cost is always in for a lot of attention since keeping it low is often the only way to make a profit. Fastermatics in plants throughout the nation are proving that they can help do that.

If you are interested in the advantages of greater precision, higher production, better quality and *lower operating costs*, let us give you complete information on how these modern Foster Fastermatics can handle your work.



FOSTER FIRSTS

Foster was first to recognize the advantages of and to develop the successful application of hydraulic feeds to turning equipment.

ONLY ON FASTERMATICS ARE ALL THESE FEATURES COMBINED

●

Bed is semi-steel casting with Nitrided Vee Ways, over 1000 Brinnel. Wear-proof nitrided ways assure permanent accuracy.

Adjusting blocks provide quick and accurate leveling of machine.

Speed changes to spindle accomplished with automatic, hydraulically controlled compensating clutches. No clutch adjustments.

New increased speed ranges.

Helical, precision lapped, alloy steel power transmission gears. No chatter or gear tooth marks.

Rugged headstock having Timken roller bearing spindle. Center bearings on all shafts eliminate whip or spring.

"Thermalign" headstock unit (optional) assures ultra-precision alignment, eliminating rejects due to thermal inaccuracies.

Easily adjusted, separate hydraulic feeds for each turret station. Correct maximum feed for each station.

Indexing turret, or non-indexing as required.

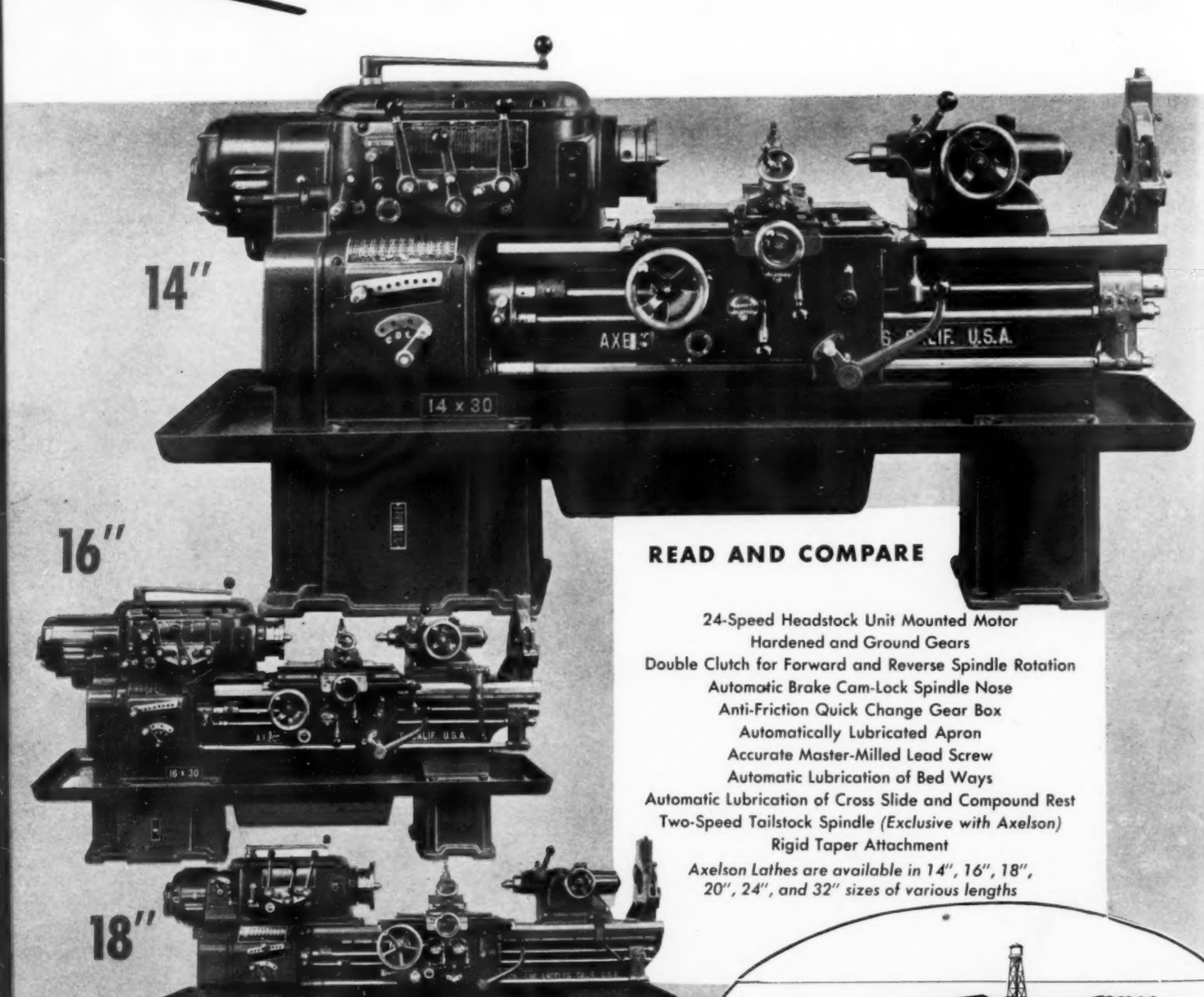
A practical machine for either long or short run lots.

WRITE TODAY FOR FULL DETAILS AND LATEST LITERATURE — 101 FOSTER BLDG., ELKHART, INDIANA

FASTERMATICS . . SUPERFINISHERS
SCREW MACHINES . . TURRET LATHES

AXELSON

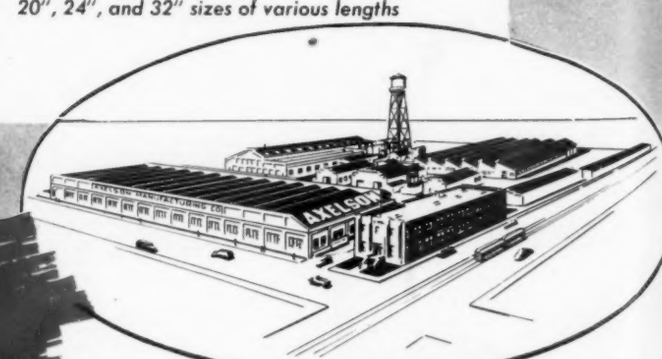
Leaders FOR ACCURACY



READ AND COMPARE

24-Speed Headstock Unit Mounted Motor
Hardened and Ground Gears
Double Clutch for Forward and Reverse Spindle Rotation
Automatic Brake Cam-Lock Spindle Nose
Anti-Friction Quick Change Gear Box
Automatically Lubricated Apron
Accurate Master-Milled Lead Screw
Automatic Lubrication of Bed Ways
Automatic Lubrication of Cross Slide and Compound Rest
Two-Speed Tailstock Spindle *(Exclusive with Axelson)*
Rigid Taper Attachment

Axelson Lathes are available in 14", 16", 18", 20", 24", and 32" sizes of various lengths



For over 25 years Axelson has been manufacturing lathes which have established a reputation for quality and satisfactory performance.

BEFORE YOU BUY ANY LATHE INVESTIGATE

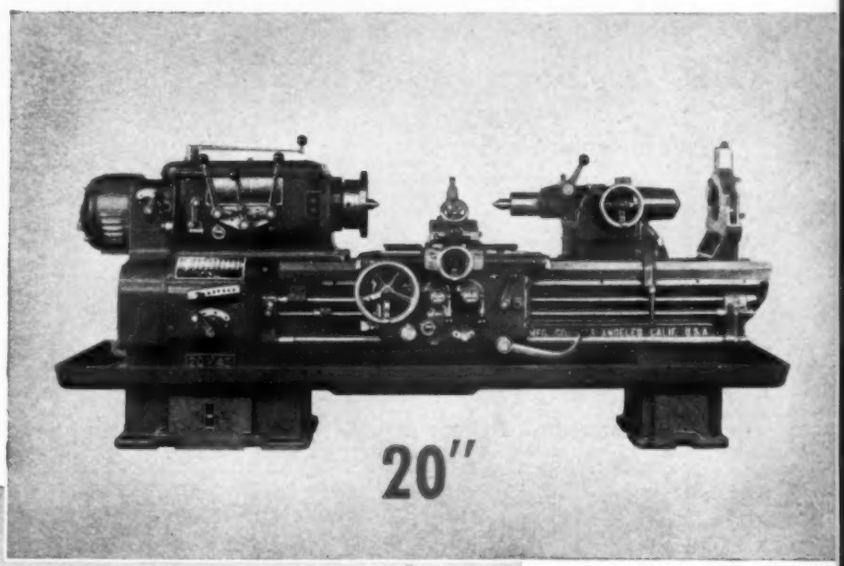
AXELSON

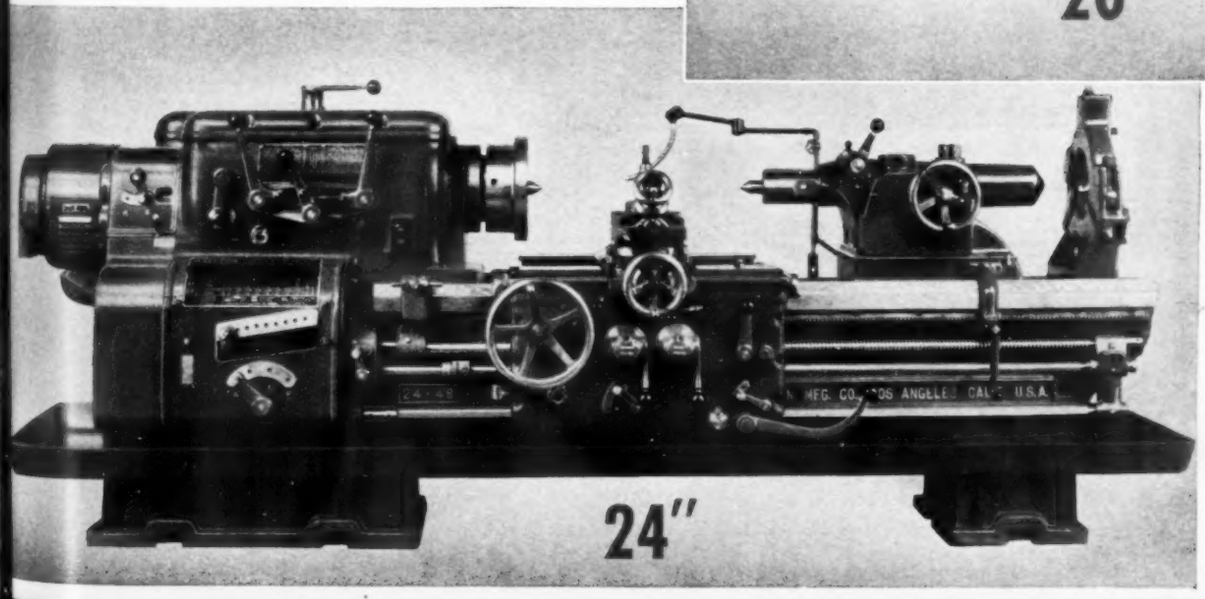
LATHES'

EFFICIENCY AND ECONOMY BUILT *Right* FROM THE GROUND UP

Engineering skill and extreme care in the selection of raw materials are wasted unless they are accompanied by equal skill and painstaking effort in manufacture. Axelson Lathes are designed right and they are built throughout of materials best adapted to the purpose. On this basic foundation Axelson craftsmen construct a machine tool precise in every operation and finished in every detail. Press the starting button upon an Axelson Lathe—listen to its smooth, quiet action. Place a job between centers, adjust the cutting tool and note how free from vibration it is at any speed and with varying cuts. Remember Axelson Lathes afford a wide range of operating speeds and feeds necessary for fast production. They are accurate and they operate smoothly year after year with minimum power consumption. Design, materials and workmanship have been combined in producing a lathe unexcelled in operation.

AXELSON MANUFACTURING CO.
6160 South Boyle Avenue, Los Angeles, California
(P. O. Box 98, Vernon Station)
50 Church St., New York • 3844 Walsh St., St. Louis





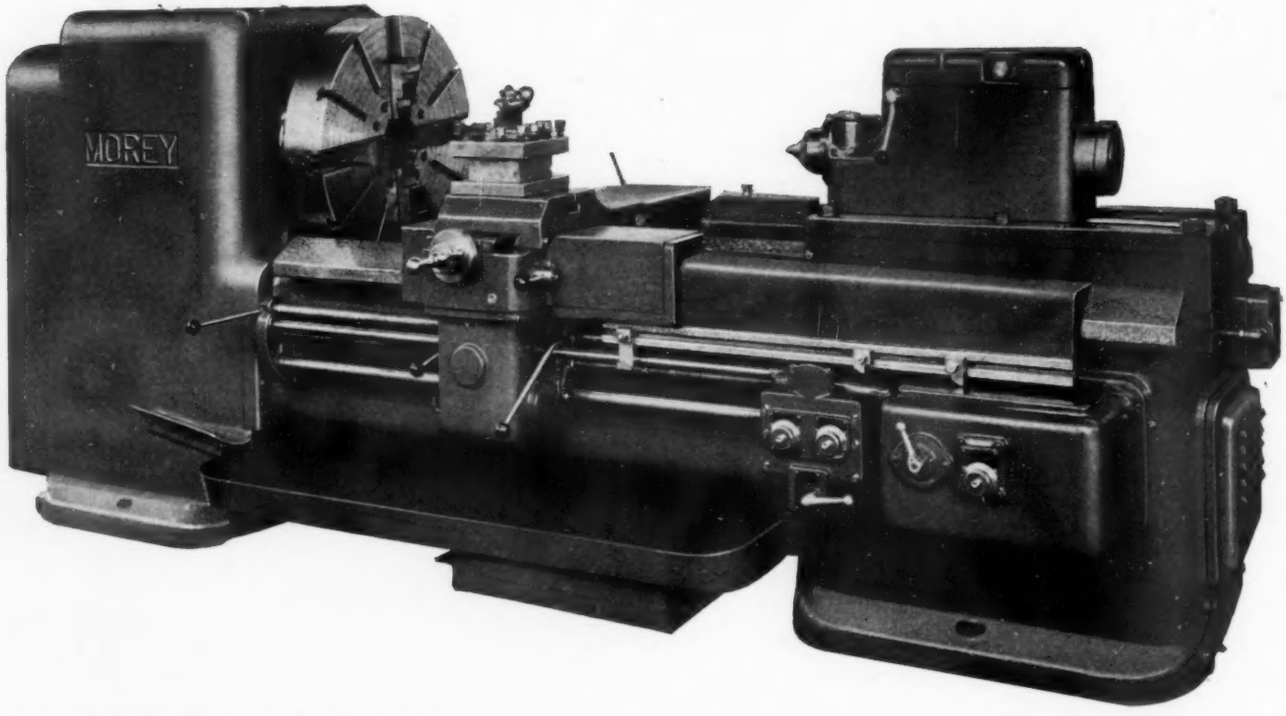
WRITE TODAY

Get a copy of Axelson's latest Lathe Bulletin giving detailed information on all sizes and types of Axelson Lathes.

24-SPEED HEAVY DUTY LATHES

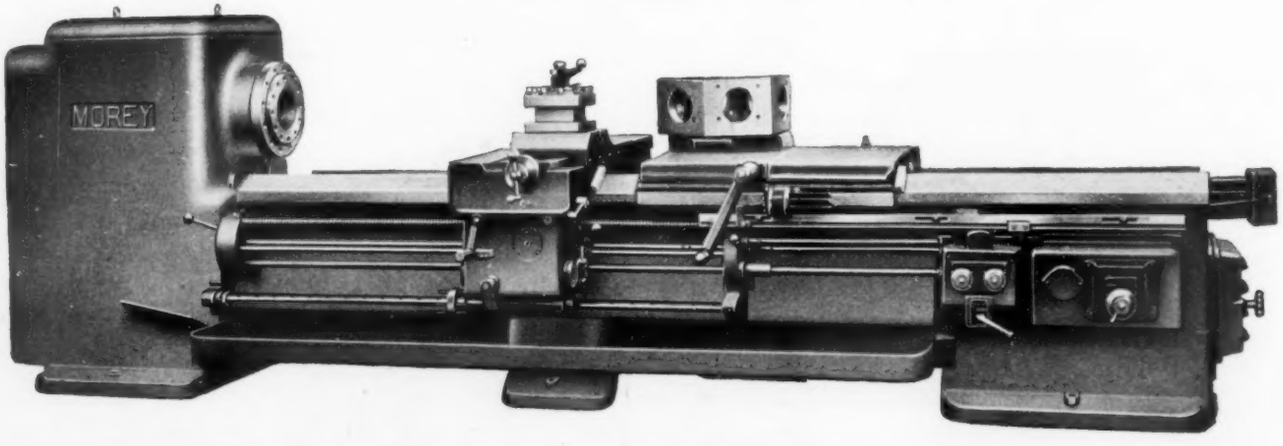
FOR SPEEDY MUNITIONS PRODUCTION!

MOREY "27" Hydraulic Manufacturing Lathe:



Featuring **FINGER TIP CONTROL** of hydraulic feeds, tailstock control, making it possible for female operators to handle heavy-duty shell turning. Made in sizes for shells from 75 mm. to 155 mm., power for maximum speeds and feeds that present-day tool steels permit. In ordnance manufacture, a combination of these machines will produce a highly efficient production line for the manufacture of shells from the rough turning to the finished turning. Speeds and feeds set up for maximum efficiency.

Write for completely illustrated bulletin No. 679



MOREY MACHINERY CO., Inc.

410 BROOME STREET **NEW YORK, N. Y.**

OPPORTUNITIES TO WIDEN PROFIT MARGINS

HOW AUTOMOBILE MANUFACTURERS LOWER UNIT COST OF MANUFACTURING

UNIT type machines, as seen across the bottom of this advertisement, have a wide application for boring, drilling, tapping, and kindred operations on automobile components. These machines avoid a hurried obsolescence in a fast changing industry because they are built from standard units which are easily readjusted to meet design changes in automobile parts. You can accommodate future design changes with only tool head and fixture purchases. Amortize these faster than a complete machine, making it easier to get your equipment appropriation.

W. F. & JOHN BARNES CO. • ROCKFORD, ILLINOIS

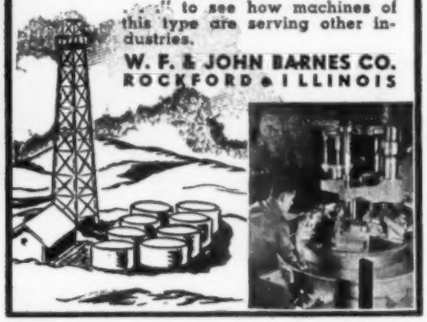
SAVED 35 DAYS Per Week

A MANUFACTURER of tools used in oil drilling was obtaining eight complete parts per eight hour day. After installation of a Barnes unit type machine, he secures eight complete parts every hour—280 more parts per week.

The machine is semi-automatic—performs drilling, facing, hollow milling, *and tapping* operations simultaneously. It accommodates 19 different parts.

Write for our booklet "Since 1872 . . ." to see how machines of this type are serving other industries.

W. F. & JOHN BARNES CO.
ROCKFORD • ILLINOIS

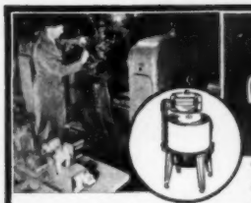


HIGH SPEED RIFLE BARREL REAMING

OVER one hundred rifle barrels reamed every hour. The machine accommodates barrels ranging from 22 to 50 caliber. In addition, drilling, chambering and crowning machines can be furnished.

Write for our "Rifle" folder.

W. F. & JOHN BARNES CO., ROCKFORD, ILL.



To Profit More Sell It for Less

This machine bores, counterbores, faces, drills and taps seven holes in washing machine parts — total time 60 seconds each. It's one of seven of our machines in daily operation for this progressive manufacturer. Why? Product cost and price are lowered, opening wider markets, and establishing a higher profit margin.

Write for our booklet "Since 1872 . . .".

W. F. & JOHN BARNES CO., ROCKFORD, ILL.

TO SHORTEN A FARMER'S DAY

OF all the modern implements used by farmers, the tractor is perhaps the most useful in saving time and labor. Most tractor manufacturers in this country have one or more Barnes unit type machines for lowering manufacturing costs — thereby making tractors available to *more* farmers.

Your product may not be tractors, but you can probably expand your market by lowering manufacturing costs. Unit type special machine tools will help you do this. Write for our booklet "Since 1872 . . .".

W. F. & JOHN BARNES CO., ROCKFORD, ILL.

How Can Airplane Production Be Increased?

PRESENT demands in airplane manufacturing necessitate the use of *special* machine tools. Two Barnes unit-type production machines recently furnished for airplane engine parts are shown to the left. These are significant of the inevitable trend towards high production methods in aircraft manufacturing. Our "Aircraft" booklet illustrates several outstanding machines designed and built for a "straight in line" engine — write for your copy.

W. F. & JOHN BARNES CO., ROCKFORD, ILL.

WANTED

Men interested in seeing the flexibility in application of unit type machine tools, to write for our booklet "Since 1872 . . .".

W. F. & JOHN BARNES CO., ROCKFORD, ILL.

35% SAVINGS

TEN YEARS of continuous operations of drill, counterbore, face and hollow mill is the record of this one installation. Over 4,000,000 pencil sharpener bases have been machined—the original savings was 35%.

Many other manufacturers are saving on unit costs with unit type special machine tools. You'll see some of these in our booklet "Since 1872 . ." —a copy of which will be mailed upon request.

W. F. & JOHN BARNES CO., ROCKFORD, ILL.

HOW TO BUILD YOUR OWN PRODUCTION MACHINE TOOLS

You can mount these hydraulic, self-contained units on new, or existing machine beds—at any required angle. Available in sizes from one to thirty horsepower for drilling, boring, milling, etc. Design your own fixture and spindle head and apply these units for a profit making machine tool. Write for our "8H-75" folder.

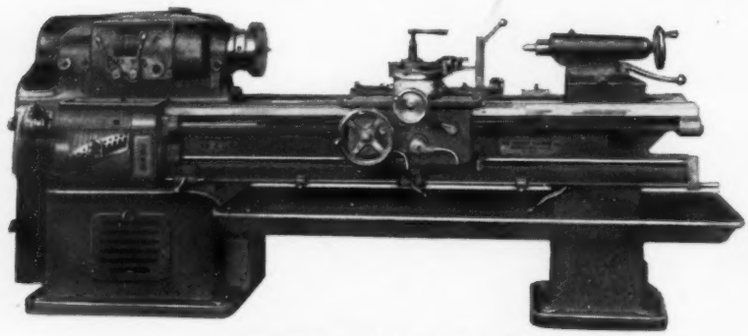
W. F. & JOHN BARNES CO., ROCKFORD, ILL.

YOUR SAVINGS BEGIN BEFORE DELIVERY

THIS MACHINE both bores and hones. Yet, costs but little more than one designed for only one of these operations. Consequently, the investment required for a complete machine is saved with your initial purchase. Subsequent savings will be realized in its ability to handle a wide range of cylinder bores and lengths. The illustrations show the varied work for which this machine is used. Long and short bores are both bored and honed. To combine these two operations so that each can be done accurately and quickly on one machine required several new design features. These are described in our "Horizontal Boring and Honing" booklet which will be sent to you upon request.

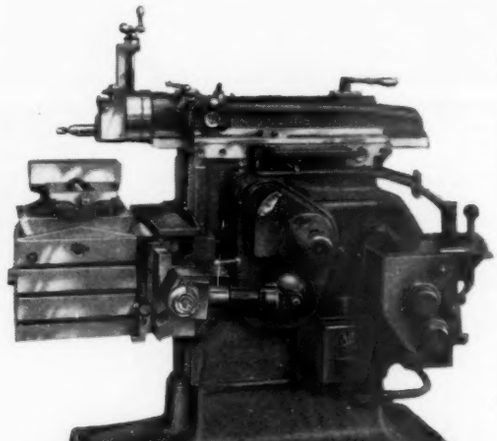
W. F. & JOHN BARNES CO.
ROCKFORD • ILLINOIS

HENDEY Standard
PRECISION-PRODUCTION
LATHES AND SHAPERS



GEARED HEAD LATHES

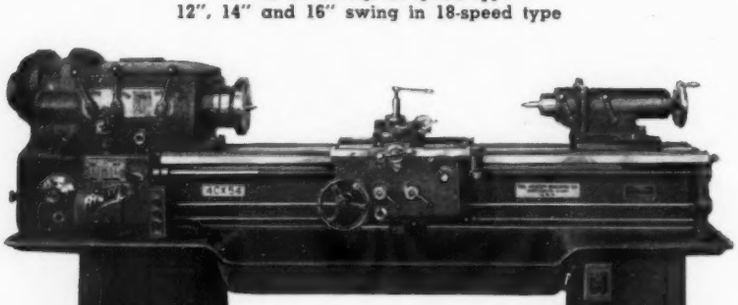
For Precision-Production
12" to 24"swing, 12-speed type
12", 14" and 16" swing in 18-speed type



12" HIGH SPEED CRANK SHAPER

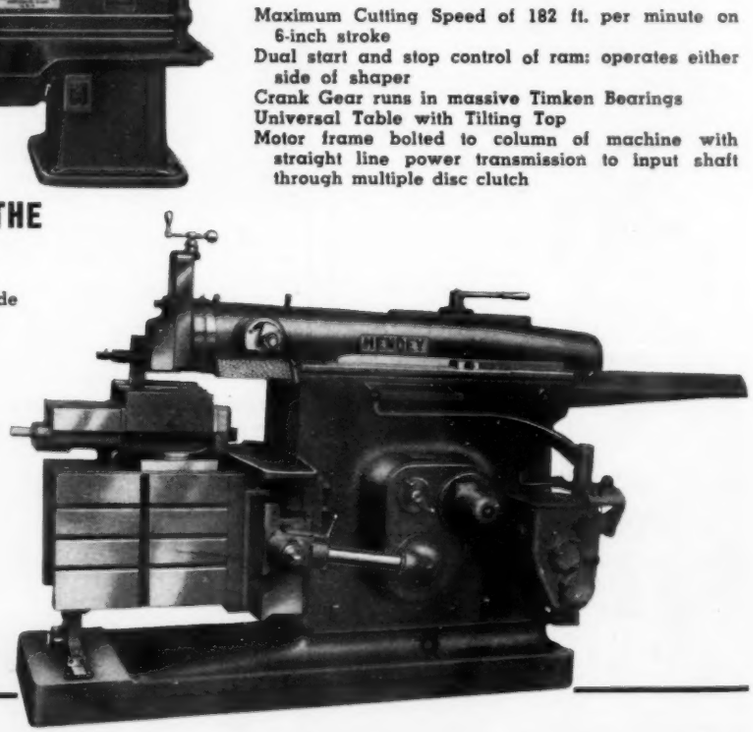
Eight Speed Changes

Maximum Cutting Speed of 182 ft. per minute on 6-inch stroke
Dual start and stop control of ram: operates either side of shaper
Crank Gear runs in massive Timken Bearings
Universal Table with Tilting Top
Motor frame bolted to column of machine with straight line power transmission to input shaft through multiple disc clutch



No. 4C
HEAVY DUTY MANUFACTURING LATHE

Swing over ways—16 1/16"
Spindle speeds (12)—30 to 1200 R.P.M.
Automatic lubrication to apron, carriage, cross-slide



HEAVY DUTY CRANK SHAPERS

16" 20" 24" 28" Stroke
Plain or universal tables
Power Rapid Traverse
Automatic lubrication
Anti friction bearings throughout

THE HENDEY MACHINE COMPANY • TORRINGTON, CONN., U.S.A.

Boston **New York** **Rochester** **Detroit** **Chicago**

MACHINE OF THE MONTH

PREPARED BY THE SENECA FALLS MACHINE CO. "THE Lo-swing PEOPLE" SENECA FALLS, NEW YORK

SHELL TURNING

with the New Model R-14

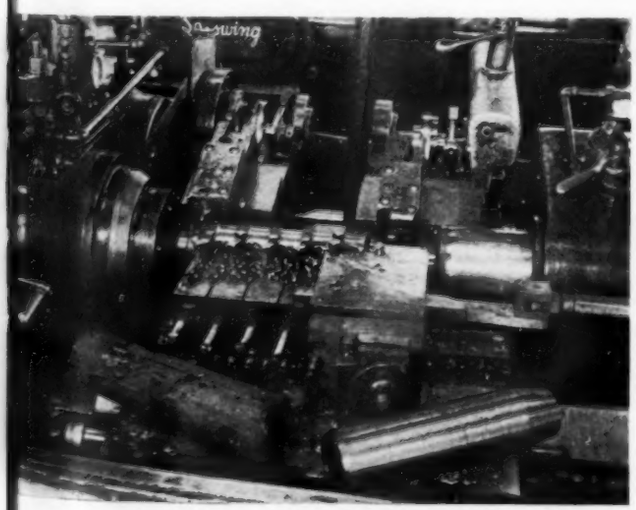
Automatic *Lo-swing*

Day in and day out shell production on a 24 hour basis is the supreme test for a multiple tool automatic lathe. Conditions in a shell plant are such that down time for adjustments and repairs cannot be tolerated. Seneca Falls engineers, through wide experience and continued application on this type of work, have developed a method of shell turning, and embodied it in the Model "R" line of Lo-Swings, that has proven very successful.

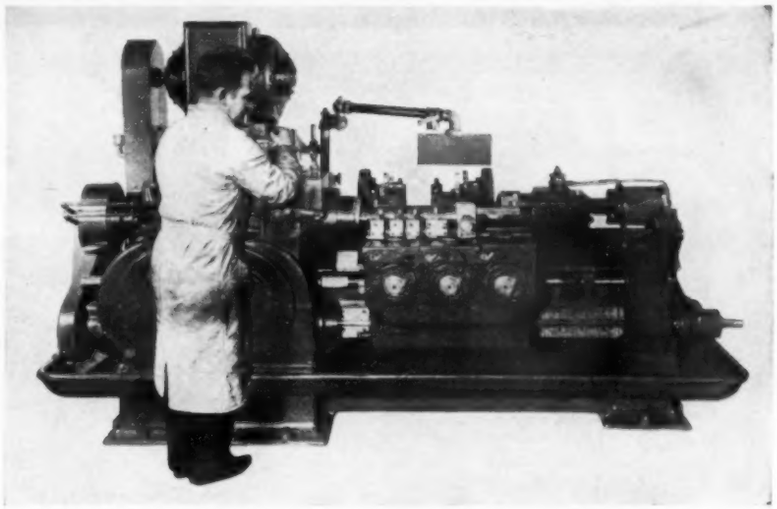
The exacting requirements of this class of work are admirably met by the new Model "R-14," largest and heaviest member of the Lo-Swing family.

FIRST—Rigidity and proper support for both the work and tools. This is of prime importance with HS steel tools but especially so when carbide tools are to be used. Lo-Swing construction meets this requisite by its massive head and tailstock; its carriage and way design which takes tool thrust directly into the bed; its hardened and ground way plates which overcome wear and the subsequent looseness and play fatal to accuracy and carbide tools; and its mechanical cam-controlled cycle which gives smooth and unvarying feeds to carriage and cross slides regardless of amount of stock or run-out on the shell.

SECOND—Unfailing power through the spindle drive, the feed works, and the shell driver itself. The Model "R-14" meets these requirements with a heavy clutch and motor drive, oversize shafts with hardened gears, feed works proportionately heavy, and an internal driver which maintains the close concentricity so necessary between the bore and O.D. and has never been known to slip.



One of a battery of Model R-14 Lo-Swings rough turning 3.45" shells in a Canadian plant.

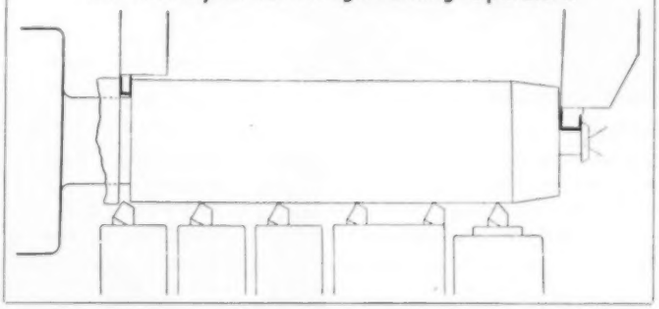


THIRD—Minimum amount of down time for any reason whatsoever. The Model "R-14" minimizes down time by reason of its simplicity; massive design and such features as automatic lubrication to head and carriage; its safety clutch which allows the feed to stop, if a jam occurs, without throwing the various units out of time; the quick and easy method of tool changing; and above all, the elimination of all "bugs" which, though minor, take a terrific toll out of the production sheet.

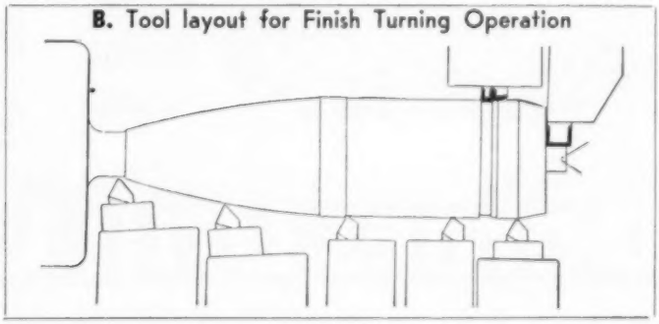
The machine illustrated is tooled for rough turning a 105m/m shell. The shell is located from the bottom of the bore and the back attachments simultaneously cut off the open end to length and face the closed end. A template controlled tool block on the carriage is used for turning the contour.

Over a period of years Model "R" Lo-Swings have demonstrated their suitability for this class of work and their ability to withstand the rough usage and abuse characteristic of shell turning service.

A. Tool layout for Rough Turning Operation



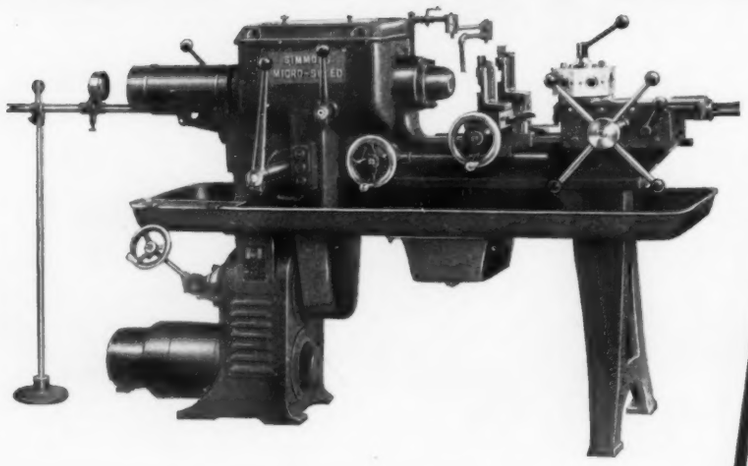
B. Tool layout for Finish Turning Operation



LATHE NEWS from SENECA FALLS

QUICK DELIVERIES ASSURED!

SIMMONS
NO. 2 TURRET SCREW MACHINE



MICRO-SPEED-DRIVE*

This sturdy machine (1¼" capacity) offers unusual quick-production advantages. It has been especially designed with every modern facility for rapid, accurate output.

The greatest possible rigidity is assured as the head is cast solid with the bed. The spindle, mounted on Timken precision tapered roller bearings, is of high carbon steel and accurately ground to size. Levers are within immediate reach of the operator.

*The patented SIMMONS *Micro-Speed Drive*, equipped with push-button control and magnetic brake, offers a range of spindle speeds up to 1,500 RPM. With this drive, the operator can immediately select by a mere turn of a handwheel the best-suited spindle speed for the class of stock to be machined.

• • •

Write today for complete specifications.

• • •

LOW COST

SIMMONS MACHINE TOOL CORPORATION

Main Office: 1759 North Broadway, Albany, N. Y.
Export Office: 149 Broadway, New York City

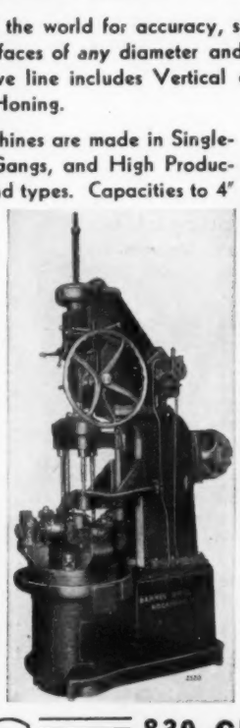
BARNESDRIL
Honing Machines
Drilling Machines

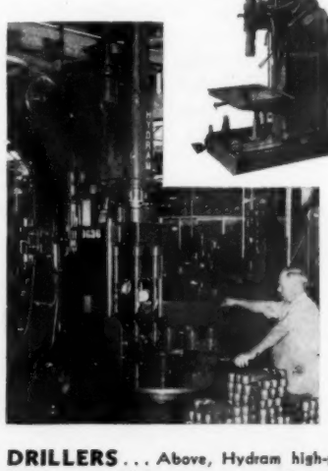
BARNESDRIL Honers lead the world for accuracy, speed, and fine finish on internal cylindrical surfaces of *any* diameter and length; also certain external honing. Extensive line includes Vertical and Horizontal, also Combination Boring and Honing.

BARNESDRIL Drilling Machines are made in Single-Spindle, Multi-Spindle, Gangs, and High Production Units. Many sizes and types. Capacities to 4" diameter drill or equal.

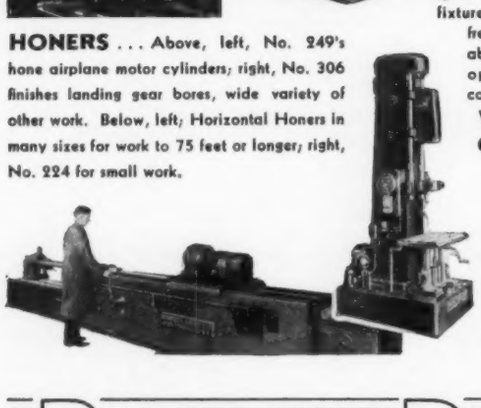
At right . . . No. 201¼ High Production Unit with Hydraulic Indexing Table. Three-spindle head and 4-station fixture gives work-handling free. Many others available for a multitude of operations in various combinations.

WRITE FOR CATALOG A





HONERS . . . Above, left, No. 249's hone airplane motor cylinders; right, No. 306 finishes landing gear bores, wide variety of other work. Below, left; Horizontal Honers in many sizes for work to 75 feet or longer; right, No. 224 for small work.



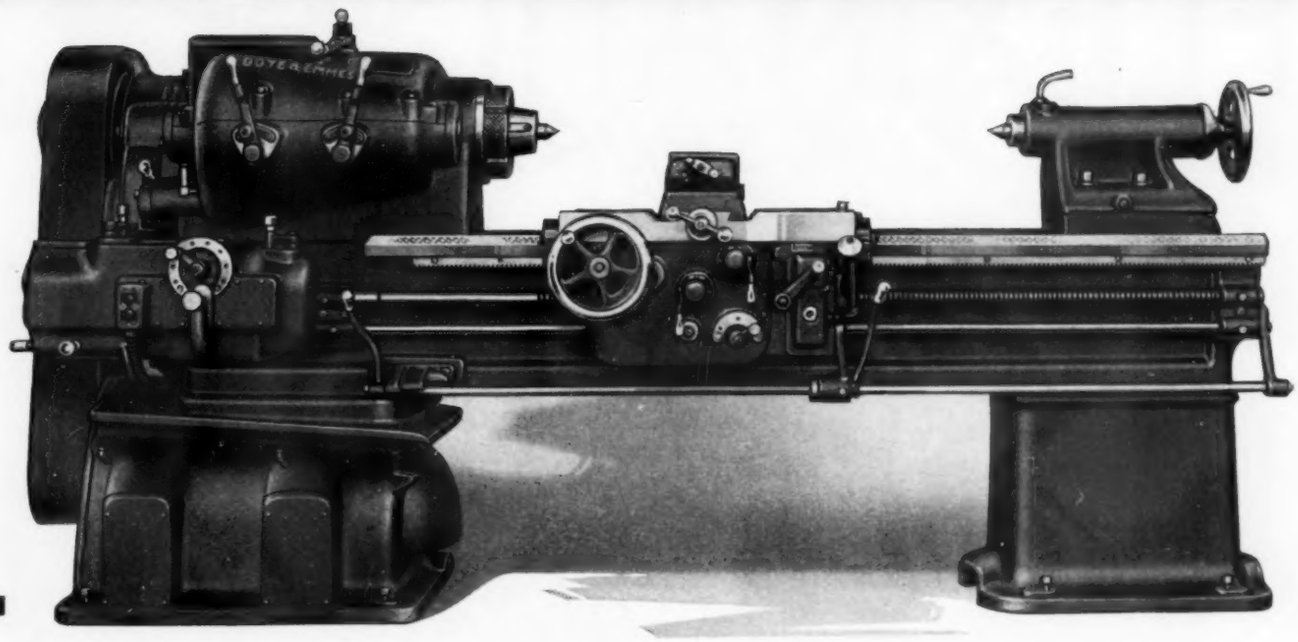
DRILLERS BARNESDRIL HONERS BARNES DRILL CO

DRILLERS . . . Above, Hydram high-production on airplane engine connecting rods. Above at right, No. 262 has adjustable head; is extremely versatile, popular in tool rooms, airplane shops. See Catalog for many other types and sizes.

Barnes Drill Co.
830 CHESTNUT STREET
ROCKFORD ILLINOIS, U. S. A.

BOYE & EMMES LATHES

DESIGNED IN EVERY DETAIL FOR ACCURACY UNDER HEAVY DUTY DEMANDS



AGENTS	CITY
Pratt & Whitney	Birmingham, Ala.
Pratt & Whitney	Boston, Mass.
Pratt & Whitney	Cincinnati, Ohio.
Pratt & Whitney	Hartford, Conn.
Pratt & Whitney	Los Angeles, Calif.
Pratt & Whitney	New York, N. Y.
Pratt & Whitney	Philadelphia, Penn.
Pratt & Whitney	Rochester, N. Y.
Pratt & Whitney	San Francisco, Calif.
Pratt & Whitney	St. Louis, Mo.
Pratt & Whitney	Cleveland, Ohio.
R. S. Dean Company	Chicago, Ill.
D. E. Morand Machinery Co.	Detroit, Mich.
Rees Machinery Company	Pittsburgh, Pa.
Moore Brothers Machinery Co.	Montreal, Canada
Nichol Machinery Co.	Milwaukee, Wis.
Frank D. Lake Company	Toledo, Ohio.
Joseph Monahan	Grand Rapids, Mich.
Equitable Equipment Co.	New Orleans, La.
C. J. Harter, Machinery	Houston, Texas
D. B. Parker	Richmond, Va.
W. P. & R. S. Mars Company	Duluth, Minn.

The product of more than 45 years experience in building precision lathes...

Heavier cuts at faster speeds but without sacrificing accuracy—can be expected and depended on with modern Boye & Emmes Engine Lathes. These sturdy modern tools used on heaviest production jobs or fine precision work will maintain accuracy and render long-lived service.

Note a few of outstanding features. Location of back gears, mounted on front of spindle provides a downward rotating pressure on the spindle with counteraction and balancing of upward lift of cutting tool.

This feature accounts in large measure for accurate performance under continuous heavy duty service. Eight of the twelve speeds for heavy cuts are available through the herringbone back gears.

Spindle is Timken precision mounted; gear box is a self-contained unit, entirely enclosed and lubricated from central reservoir; carriage is of rigid design, with wide bridge and deep dovetail and is jig drilled to receive taper attachment and follower rest at any time. These and other important details are fully described in bulletin available on request.

The BOYE & EMMES MACHINE TOOL *Co.*

CINCINNATI OHIO

Already on the Job for National Defense!

FLEXIMATIC

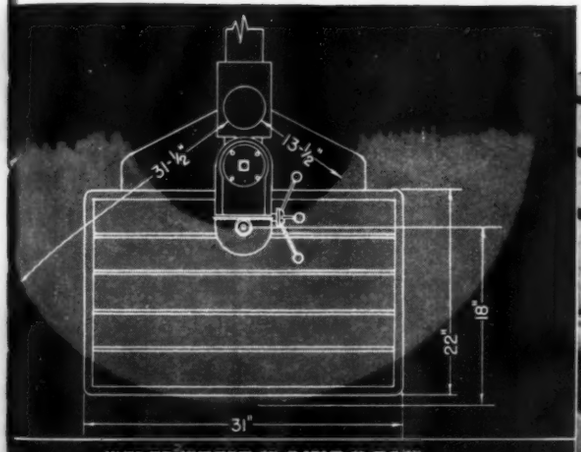
by KINGSBURY

Production of intricately machined parts is immeasurably speeded up when FLEXIMATICS are put on the job. The machines shown here are already at work on munitions, performing multiple operations on fuse parts, rifle components and other ordnance jobs. Similar FLEXIMATICS—made up of standard units mounted on standard bases—can solve your problems of delivery dates, labor costs and government standards of accuracy by performing a variety of simultaneous operations in a single chucking of the work.

KINGSBURY MACHINE TOOL CORPORATION

KEENE NEW HAMPSHIRE U S A

A New Radial Drill At a New Low Price



SPECIFICATIONS

JACOBS CHUCK: 0 to ½" capacity or No. 1 Morse Taper.

TABLE SIZE: 31" x 22", machined surface: 28" x 19".

SPINDLE SPEEDS: four speeds from 600 to 5000 R.P.M. with 1740 R.P.M. ½ H.P. single phase motor. Eight speeds from 600 to 10,000 R.P.M. with two speed 1740-3500 R.P.M. three-phase motor with push-button control.

Height overall: 72"—Width overall: 31"—Depth, front to back: 58"—Shipping weight: 450 lbs.

BALL-BEARING MOUNTED—the sliding ram is carried on eight precision ball bearings with provision for take-up in case of wear.

SIX SPLINE SPINDLE—carried on four precision ball bearings. Drive pulley straddle-mounted to eliminate strain on spindle.

DRILL PRESS HEAD—cast in one piece, precision bored to fit machined column.

RUN-OUT ACCURACY—Guaranteed well within all commercial and industrial tolerances. Actually more accurate than many machines costing two or three times as much.

CAPACITY—RANGE is illustrated by the drawing above. Note that this machine will drill to the center of a 62" circle. Distances not illustrated are: Maximum distance nose of chuck to table: 13⅛"—Vertical traverse of spindle: 3¼"—Column diameter: 3¾".

N. B.—The new Walker-Turner Radial Drill when locked in drilling position is extremely rigid and has a minimum deflection. The drill may be tilted to 45° either right or left with relation to the table.

$325
(Including Motor)
Steel Stand $25. extra
F. O. B. Plainfield, N.J.

for DRILLING · TAPPING · LIGHT PROFILING

No longer need you pay two to three thousand dollars for a radial drill to perform light duty operations. **For less than one-fourth** of former costs, the new Walker-Turner Radial Drill will perform drilling, tapping, routing, light profiling and other such operations with speed and accuracy. The new Walker-Turner Radial Drill is more versatile than other drills because **the head can be tilted up to 45°** either right or left.

This new radial drill is priced at **only $325.**, F.O.B., Plainfield, N.J. This exceptionally low price is made possible by the combination of standard parts of two other service-tested Walker-Turner machines. It combines the base, column and sliding ram of the Walker-Turner Radial Saw with the head of the Walker-Turner Drill Press—over 50,000 of which are now in service in all types of industries. Check the specifications and performance ability of this new Radial Drill against your production problems. Write today for further information to Walker-Turner Co., Inc., 601 Berckman Street, Plainfield, N. J.

walker-turner COMPANY, Inc.

WALKER-TURNER MACHINE TOOLS

FOR METAL, WOOD AND PLASTICS

Dependability..

MEN AND MACHINES MUST HAVE IT!

● Wherever Cleereman Drilling Machines and Jig Borers are used, dependability of machines is added to the dependability of operators. This is the combination that lowers costs, and turns out better work in greater quantities.

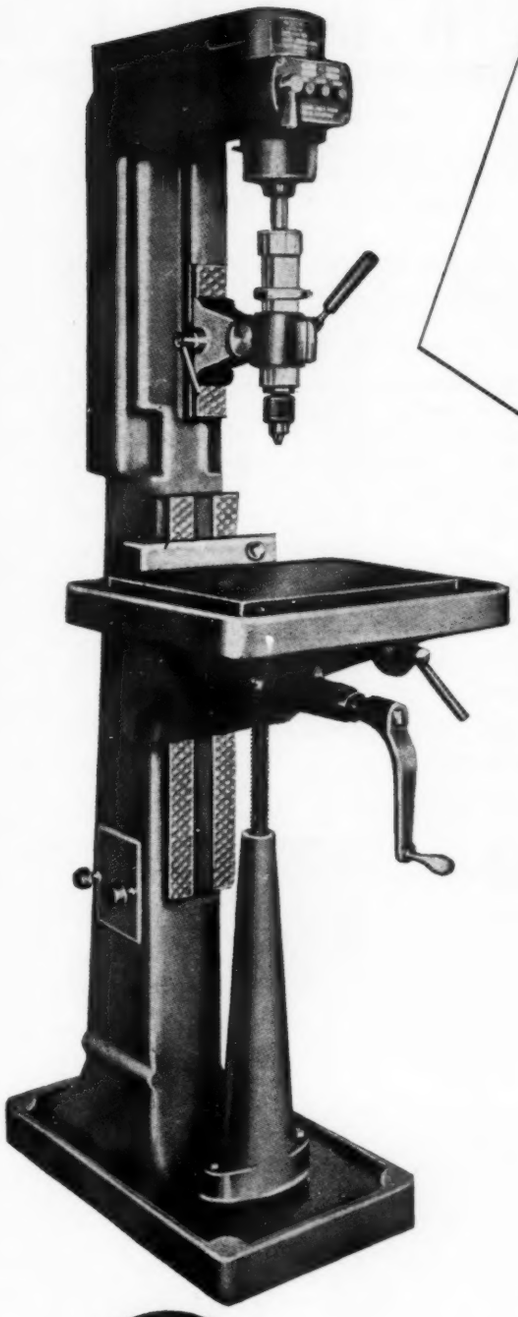
The materials and workmanship in Cleereman Machines are of highest quality. Cast parts are designed for great rigidity and are made of dense, close-grained metal which is highly resistant to wear and shock. All important castings are normalized before being finished machined. Steel parts subjected to wear are hardened, gears are precision ground, and bearings are of great size to minimize wear.

Let Cleereman dependability aid production in your shop.

Address
Bryant Machinery & Engineering Company
400 W. Madison St., Chicago, Ill., U. S. A.
Sales Division of
Cleereman Machine Tool Company

CLEEREMAN

DRILLING MACHINES and JIG BORERS



For TIME-SAVING
TOOL-SAVING
SMALL HOLE DRILLING

8 SPINDLE SPEEDS
1200 to 12,000 R.P.M.

Motor-Avey

TYPE MA-8

Faster Faster!

Speed up production—

For small drilling we have designed the new Motor-Avey MA-8 for intensive high speeds.

Eight spindle speeds

1200 rpm to 12000 rpm. Push button control—one to six spindles—all features that will keep production up and costs down.

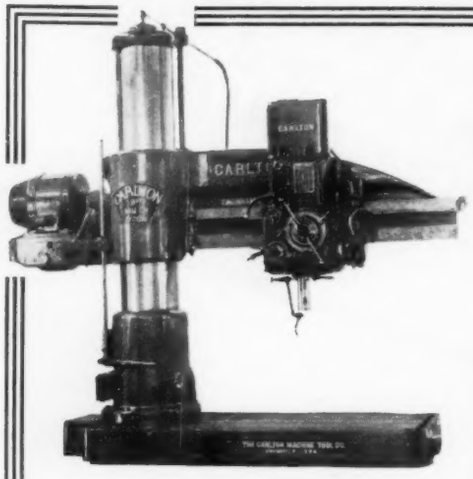
Send for details of the complete line of Avey Drilling Machines—There's one for every line of work.

1¼" TO .010

Avey DRILLING MACHINE COMPANY
CINCINNATI, OHIO

THE BEST AGENTS *Everywhere!*

CARLTON RADIALS



Investigate the possibilities of Carlton Radials on your production.

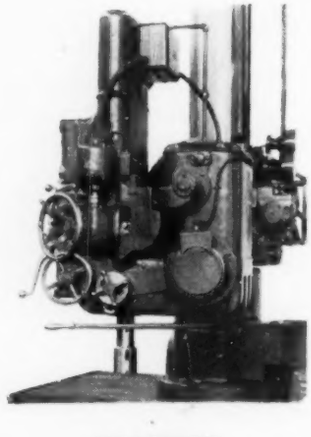
Outstanding high productivity and economy can be depended on with CARLTON ANTI-FRICTION BEARING, LOW HUNG DRIVE RADIALS—the machines that have anticipated all needs for long-hour service.

Every detail of design—from the low hung drive which permits an exceptionally large diameter spindle to be used to the convenient grouping of controls to simplify operation of the machine. This arrangement insures fast accurate work on any job.

Built on the unit principle with every part interchangeable—all gears are of alloy hardened steel for long life—anti-friction bearing equipped throughout for maximum efficiency — all power driven parts enclosed in oil filled housings provide automatic lubrication—these and many other features of the Carlton contribute to the speed, rigidity and durability of these modern machines.

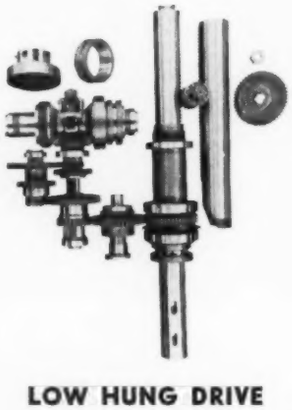
● ***SIZES AVAILABLE***

3' to 12' arms.
9" to 26" diameter column.
Can be furnished with either constant or adjustable speed motor drive.
Write for detailed specifications.



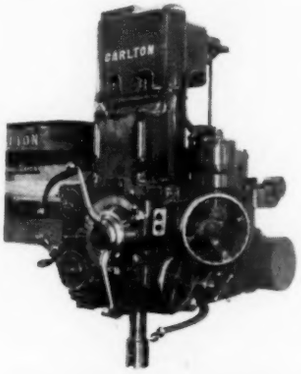
BALANCE

The low hung spindle drive on the Carlton Radial permits the use of a massive semi-steel iron casting having a deep and fixed section of metal above the arm way for maximum rigidity and strength.



LOW HUNG DRIVE

Main driving gear to spindle is mounted below the arm and drives on the largest diameter of the spindle closest to the cutting tool. We pioneered and have been using this type of Drive for 22 years.



CENTRALIZED CONTROL

Pushbutton controls are provided for traversing head along arm and for clamping column. Single lever control is provided for raising, lowering, clamping and unclamping arm. Two levers control feeds and tap lead selection. All speeds are selected by conveniently placed levers.

"Anti-friction Bearings Throughout"

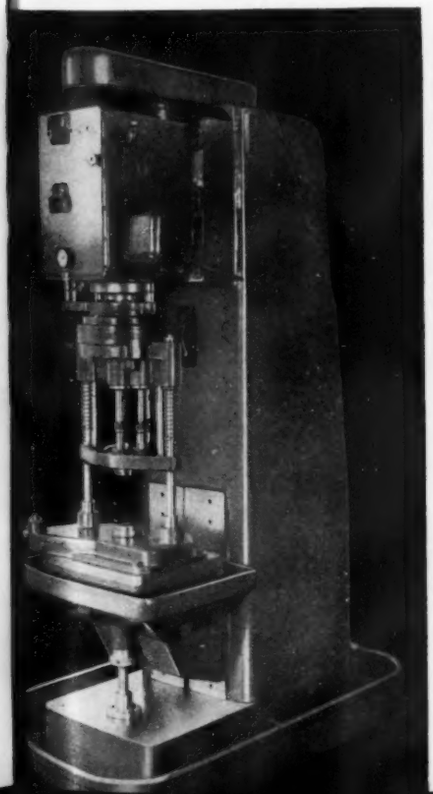
—SPECIAL FEATURES—

1 — LOW HUNG DRIVE TO THE SPINDLE 2 — ALL POWER DRIVEN PARTS RUNNING IN OIL 3 — QUIET RUNNING AT ALL SPEEDS 4 — CONCENTRATED AND CONVENIENT CONTROLS 5 — CONSTRUCTED ON UNIT PRINCIPLE

The CARLTON
MACHINE TOOL COMPANY
CINCINNATI, OHIO, U. S. A.

STANDARD No. 5
Le Maire Vertical Drilling Machine, hydraulic feed, for fast production with single or multiple spindles. Drilling — boring — reaming — counterboring — hollow milling — chamfering and comparable operations. Multiple head machines usually have spindles closely grouped. Designated "No. 5" because it is designed for motors up to 5 hp.

STANDARD No. 10
General feature comparable to No. 5 machine. Equipped with multiple head and bushing plate, tooled to drill clearance holes on aircraft "Master" connecting rods. One operator runs two machines by having push button controls on left and right sides respectively.



You Can Get *Fast Production* at *Low Cost* with these

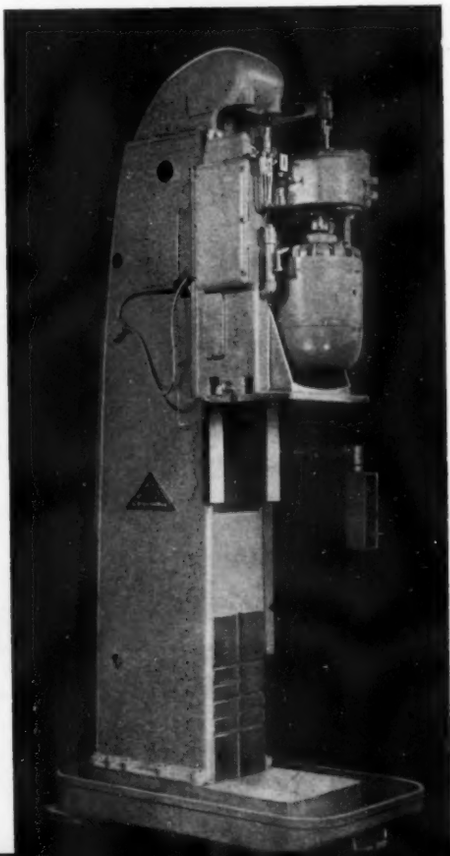
LE MAIRE Hydraulic Feed Drills

Reasonable delivery if you order NOW. Send coupon for full details

If you are looking for ways to get fast production at low cost, investigate these Le Maire machines that are adaptable for drilling and comparable operations. Power heads are completely self contained standard units. Manufactured in quantities, orders can be filled by merely designing and producing the necessary beds, work holding fixtures and special multiple drilling heads. This facilitates deliveries.

Send the coupon today or write for information. Reply will be sent by return mail entirely without obligation to you.

STANDARD No. 20
Differs from Nos. 5 and 10 in that the head slides on bearings planed on column. Work holding fixture mounted on machine bed.



See advertisement on page 416 for information on Le Maire self contained Hydraulic Feed Units used in these machines.

LE MAIRE
Tool & Manufacturing Co.

2657 So. Telegraph Rd.

DEARBORN MICHIGAN

Send this Coupon TODAY

Gentlemen: Please send me specifications at once on the drilling machines advertised in American Machinist. I am particularly interested in the following size:
#5——— #10——— #20———. For data on Hydraulic Feed Units check here .....

Name .....

Company .....

.....

City .....

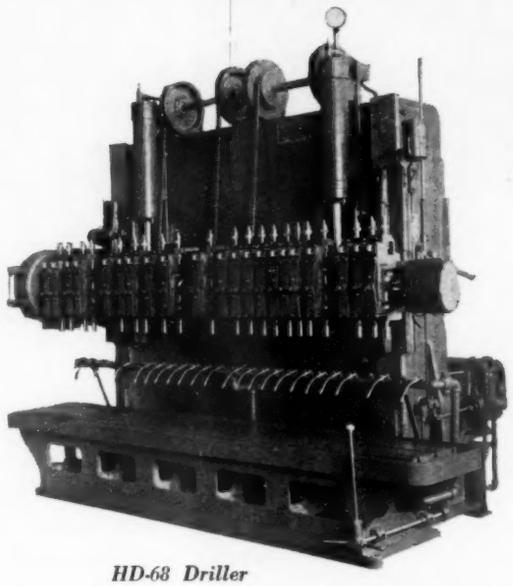
Heavy Duty Multiple Drilling Speeds Production

Many a tough drilling problem has been solved by the use of these rugged, rigid and powerful machines. Your problem may be next.

Straight line or special out of line drilling can be done to advantage with Moline hydraulic feed drillers. Easily adjustable spindle centers provide maximum adaptability to different jobs.

The HD-68 has an approximate capacity of fourteen 1¼-inch drills in steel. This machine is furnished in six standard sizes ranging from 4 feet to 20 feet in length.

When in need of information on Boring — Honing — Drilling — Tapping or Special Production Machines. Write to —



HD-68 Driller

MOLINE TOOL COMPANY

MOLINE, ILLINOIS
ESTABLISHED 1901

CABLE ADDRESS: "Holehog" Moline

for Results

USE

Mc GRAW-HILL
DIRECT MAIL LIST SERVICE

McGRAW-HILL
DIRECT MAIL LISTS

As business paper publishers for over fifty years, McGraw-Hill is uniquely equipped to offer complete, authoritative direct mail coverage of Industry's major markets. Extreme accuracy is maintained (guaranteed to 98%) and through careful analysis of markets, complete classification of companies and personnel, etc., the widest possible selections are available. Send for handy reference folder "Hundreds of Thousands of Reasons Why" which describes how McGraw-Hill Lists are built and maintained.

• What Fields Do You Want to Reach? •

Aviation Industry
Bus & Transit Industries
Business Executives
Chemical Process Industries
Civil Engineering & Construction
Coal Mining
Electrical Appliance Dealers
Electrical Contractors
Electrical Industry
Electrical Wholesalers
Food Industries
Manufacturing Industries
Metal Mining
Metal Working Industries
Mill Supply Distributors
Power Engineers
Product Engineers
Radio Dealers & Wholesalers
Radio Engineers
Textile Industries

For further details, selections from above basic classifications, counts, prices, etc., or estimates on special lists . . . ask any representative or write to

DIRECT MAIL DIVISION....
McGRAW-HILL PUBLISHING CO.
330 W. 42nd STREET NEW YORK, N. Y.

. . . Complete lists covering industry's major markets

WALTHAM MACHINES

. . point the way to speed and savings in 1941 . .

WALTHAM SUB PRESSES and DIES

Better work of finer quality and of uniformly high precision is assured with Waltham Sub-Presses and Dies. Big time and money savings can be made because stampings are cleaner and require no hand filing and finishing. Parts are ready for immediate assembly when produced on Waltham Sub-Presses.

These units are sturdy and rigid in construction, with correct alignment constantly maintained. Accuracy can be depended on at all times.

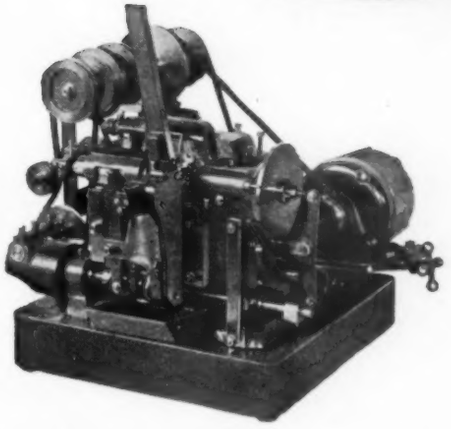
Waltham offers both arch and overhang types in sizes up to 6-inch plunger diameter. Write for further information.

ARCH TYPE

WALTHAM AUTOMATIC PINION and GEAR CUTTERS

Tool room standards of accuracy can be maintained by any operator with these fast, compact, automatic high production machines.

Designed for producing small gears and pinions up to 1½ inch pitch diameter, Waltham Automatic Pinion and Gear Cutters are fast and powerful—ideal units for the low cost production of such parts as watch, meter and gage pinions, gears and sectors. Fully automatic operation for small diameter pinions can be attained by the use of magazine feed specially designed for this machine. Cutters are also available for Waltham and similar machines. Descriptive literature will be sent promptly on request.



WITH MAGAZINE FEED AND MOTOR DRIVE

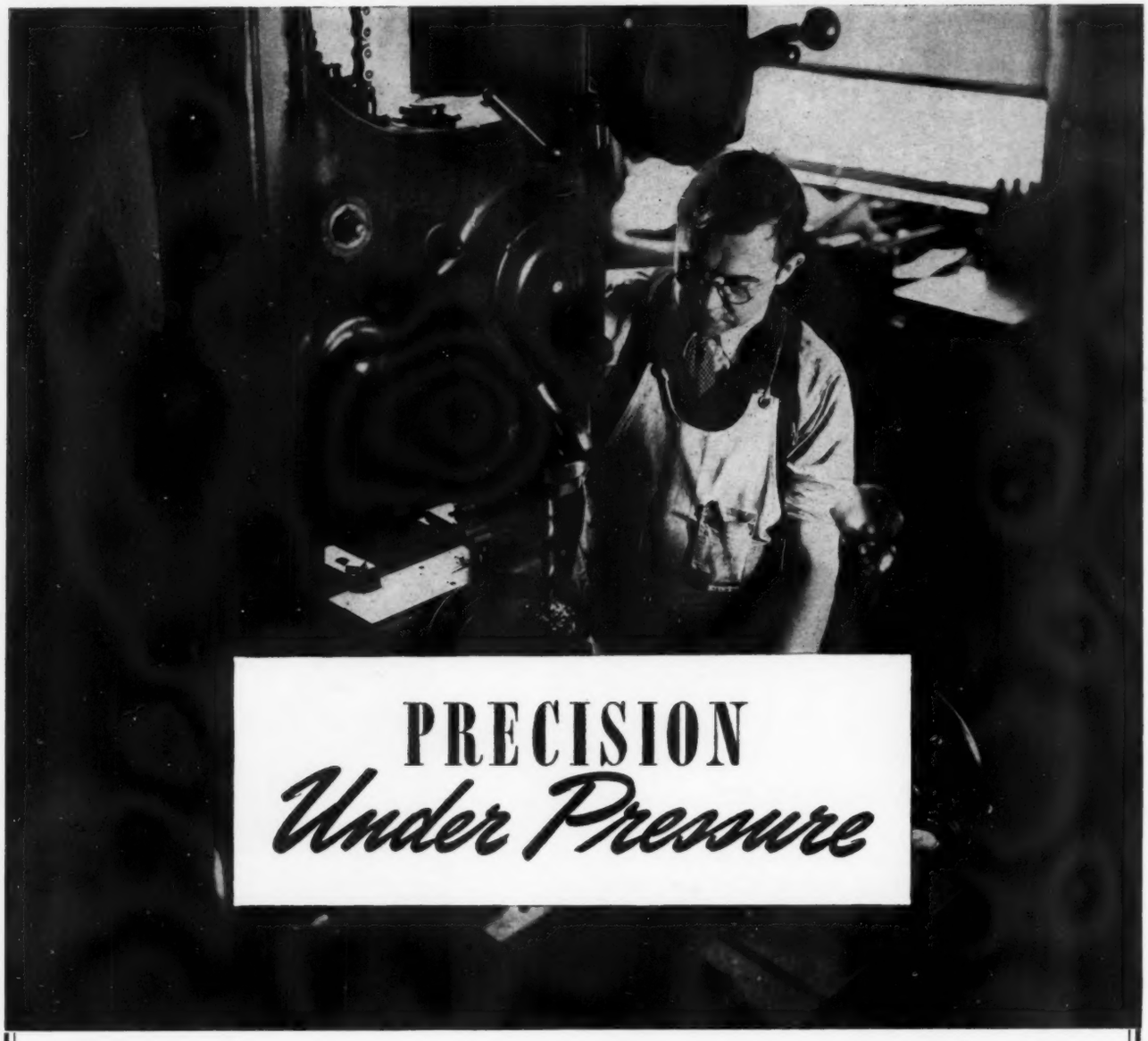
WALTHAM THREAD MILLERS

Precision production thread milling can be handled on Waltham Thread Millers in addition to tool room requirements. These machines are modern and versatile. They will produce precision threads and small worms up to 2" in diameter. V, N.S., Whitworth and Buttress threads as well as special type threads can be cut on Waltham machines with high precision and with equal ease and convenience.

Complete specifications are available on request.

WITH CABINET BASE AND MOTOR DRIVE

WALTHAM MACHINE WORKS WALTHAM . . . MASS.

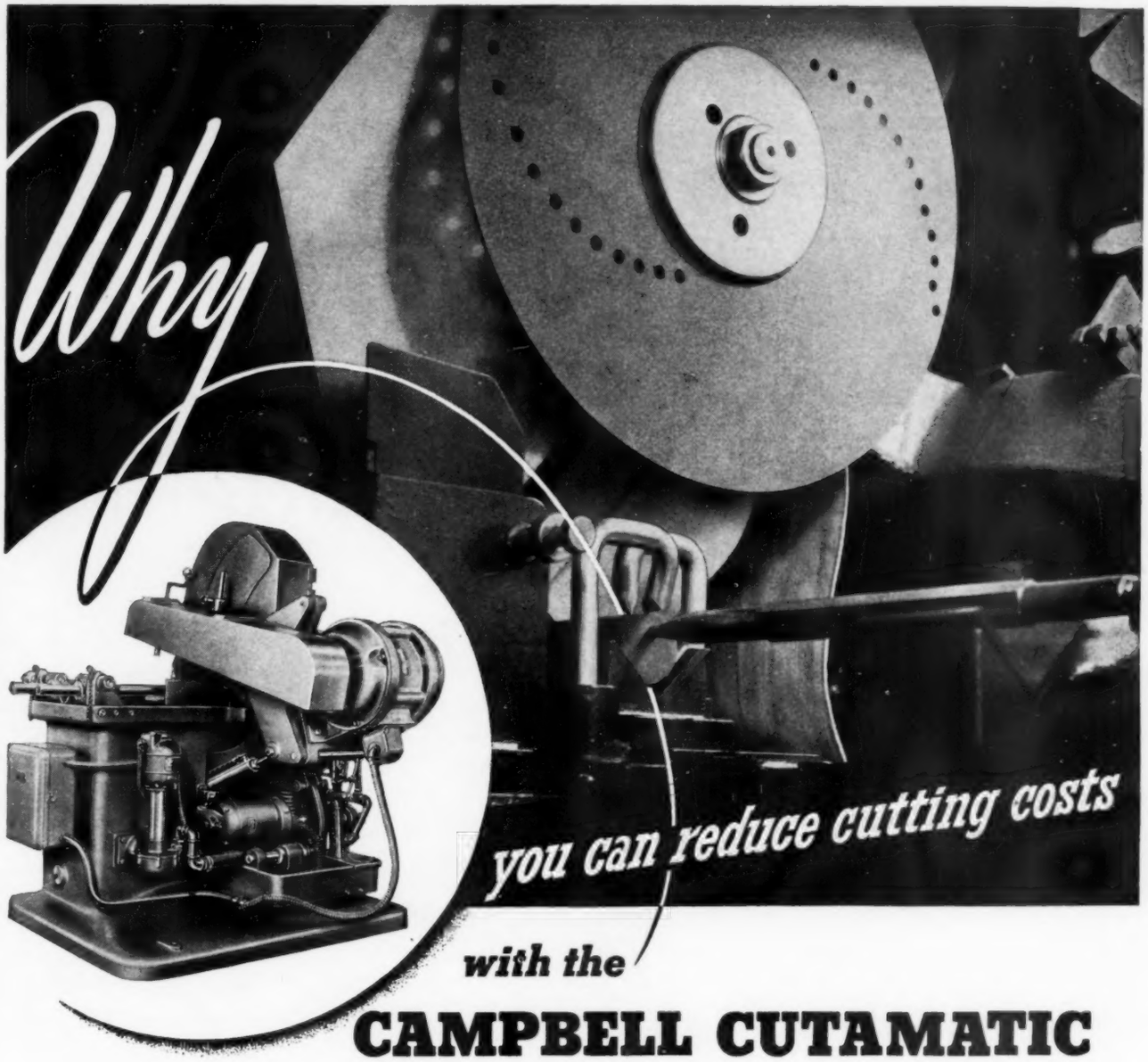


PRECISION
Under Pressure

The entire Taft-Peirce Contract Manufacturing Division — its designers, craftsmen, inspectors, its versatile array of more than 1000 machines — is working *against the clock* — at high efficiency and at high speed. Yet it is maintaining standards of *precision* that are not usually associated with high-speed production.

Never **— at Taft-Peirce — have precision, care, and *quality workmanship* been sacrificed under pressure. . . . If you need assistance in the design, tooling up, and manufacture of any product, whether a single part or a complete mechanism in quantity lots, we invite you to send for complete information on our facilities and how they may serve your needs. . . . Simply write, on your company letterhead, to the Taft-Peirce Manufacturing Company, Woonsocket, Rhode Island, U. S. A.**

TAKE IT TO TAFT-PEIRCE



with the

CAMPBELL CUTAMATIC

● You can reduce cutting costs with a **Campbell Cutamatic** because the machine employs sound, proved cutting principles in a very efficient way—also because it has many features that save the operator's time.

That is why you can cut through tough metals and other materials of large section at the rate of a square inch each 12 seconds.

That is why cut surfaces are so smooth that finishing operations are usually not required. That is why the material is in no danger of being burned or case-hardened.

Write for the booklet, *"Design for Cutting Costs."* You may find it valuable.

BUY ACCO QUALITY *in Campbell Cutting Machines; Wright Hoists, Cranes and Trolleys; Page Welding Electrodes; American Chains; Tru-Lay Preformed Wire Rope; Reading-Pratt & Cady Valves; Page Wire Fence.*

ANDREW C. CAMPBELL DIVISION • BRIDGEPORT, CONNECTICUT

DESIGNERS AND BUILDERS OF SPECIAL MACHINERY

AMERICAN CHAIN & CABLE COMPANY, Inc.

AMERICAN CHAIN DIVISION
AMERICAN CABLE DIVISION
ANDREW C. CAMPBELL DIVISION
FORD CHAIN BLOCK DIVISION

HAZARD WIRE ROPE DIVISION
HIGHLAND IRON AND STEEL DIVISION
MANLEY MANUFACTURING DIVISION
OWEN SILENT SPRING COMPANY, INC.

PAGE STEEL AND WIRE DIVISION
READING-PRATT & CADY DIVISION
READING STEEL CASTING DIVISION
WRIGHT MANUFACTURING DIVISION

In Canada:
DOMINION CHAIN COMPANY, LTD.
In England:
BRITISH WIRE PRODUCTS, LTD.
THE PARSONS CHAIN COMPANY, LTD.

ARSENALS THE WORLD OVER CHOOSE LAPOINTE

FOR PRECISION ORDNANCE BROACHING

Broaching breech-rings is a Lapointe development that has been in use for several years in Arsenals all over the world. In the job illustrated, a Lapointe Hydraulic Broaching Machine is used with a set of six broaches and a special fixture for broaching breech-rings for anti-aircraft guns and other ordnance.

The broach-ring is finish-machined all over and has a 3″ diameter hole bored in the proper location. From this boxed hole the broaches are passed through in their proper sequence and develop a T-shaped hole, a part of which has a $1\frac{1}{4}°$ taper. The material used in these gun parts is exceptionally tough and the broaches must be of extremely rugged design. Also, to make these gun parts interchangeable, and because it

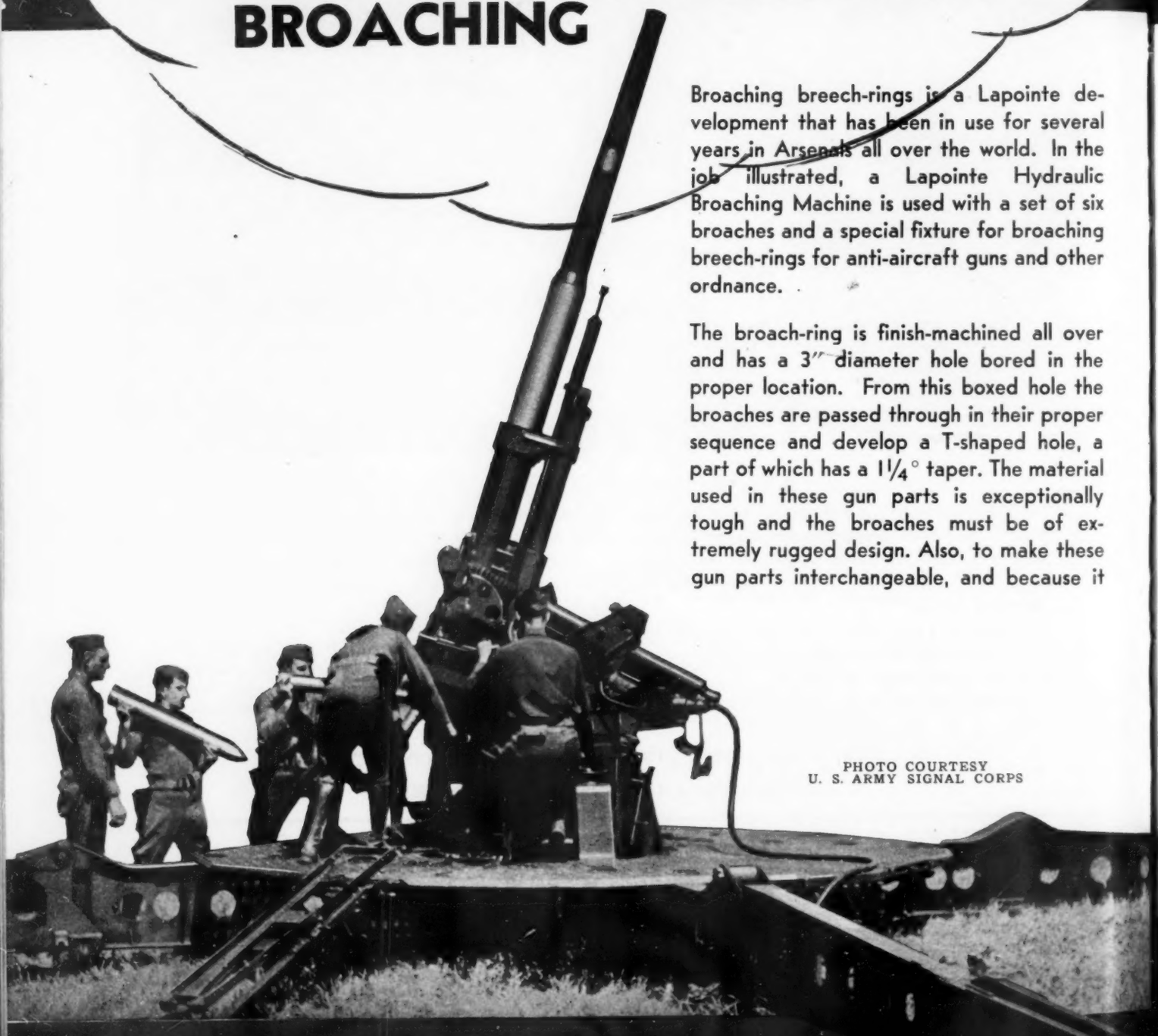
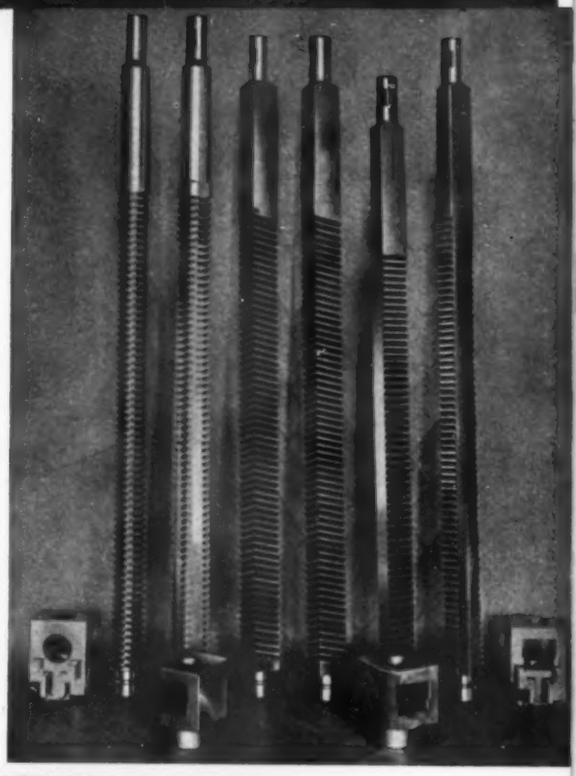


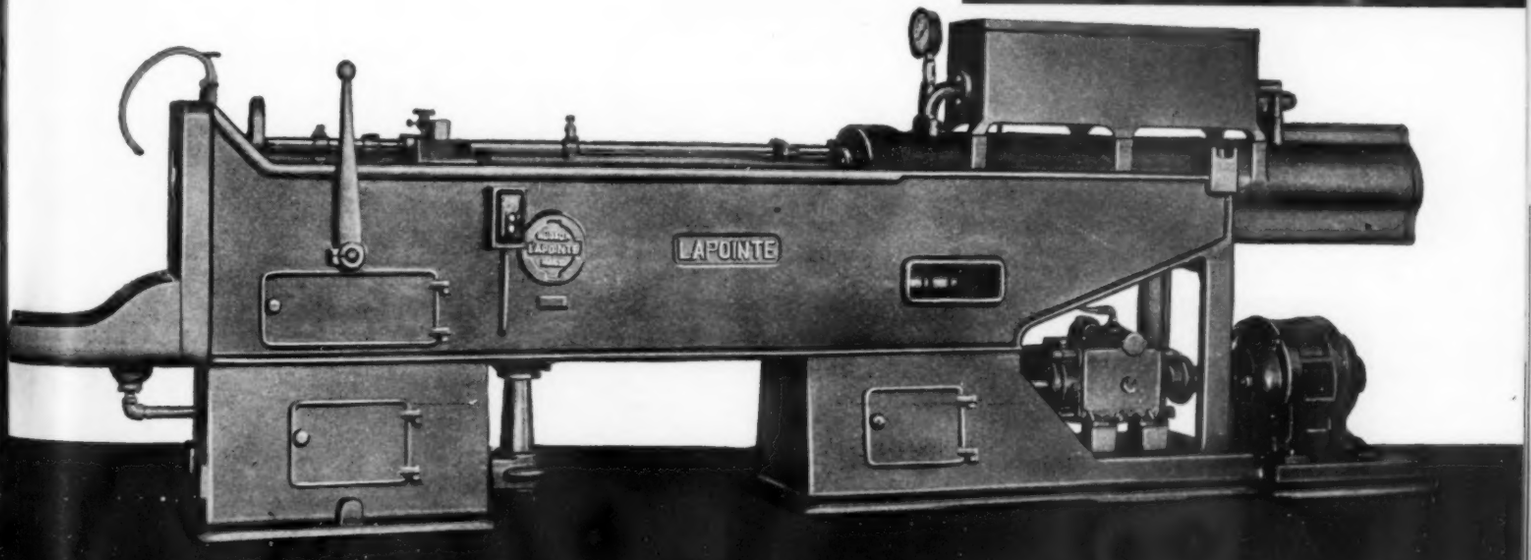
PHOTO COURTESY
U. S. ARMY SIGNAL CORPS

is impossible to use a final finishing broach to complete the entire contour of the hole, the broaches must be of exceptional accuracy, so that they follow one another to produce a contour that will be free of all defects.

Lapointe broaching has made it possible to produce these rings ten to fifteen times faster than by the method previously used. Accuracy is far greater and more consistent. Lapointe engineers have developed broaching methods, machines and equipment for all forms of manufacture for National Defense. Lapointe, the pioneers in the art of broaching, have been responsible for improved manufacturing methods in aircraft, ordnance, and other high production industries.



Let Lapointe engineers show you how to speed up production by producing accurately finished parts in one quick, efficient operation. Write for details, outlining your work.



LAPOINTE MACHINE TOOL COMPANY, Hudson, Mass., U. S. A.

SPEED

BROACHING OF 81 MM SHELLS

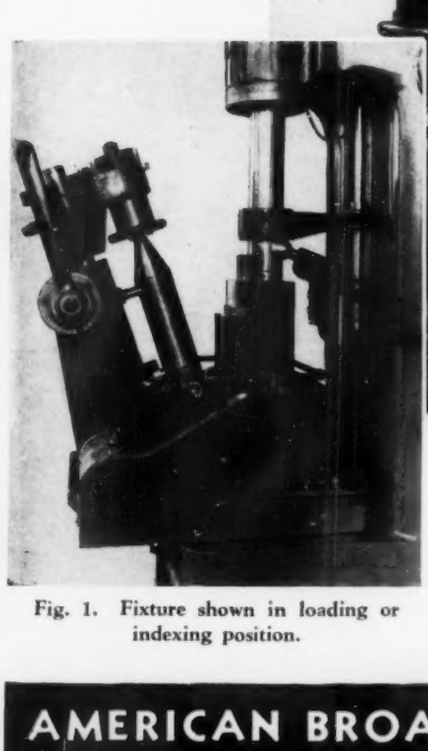


Fig. 1. Fixture shown in loading or indexing position.

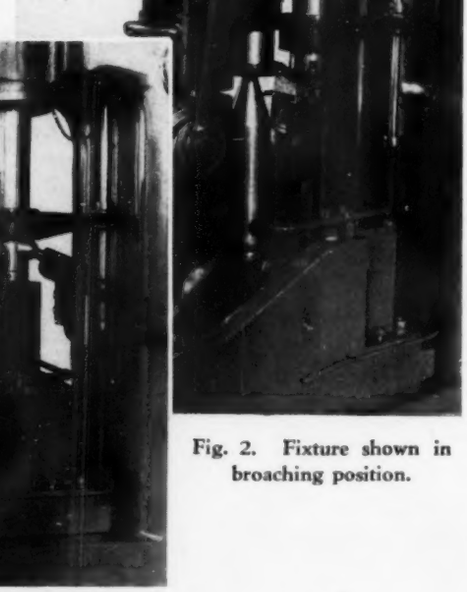


Fig. 2. Fixture shown in broaching position.

The "American" broaching machine shown to left was recently furnished for use in connection with the Defense Program.

The machine is a standard V-2 6-ton vertical hydraulic press with special tooling for broaching three bourrelet grooves on outside diameter of 81 mm. shell. Production obtained is 70 pieces per hour at 85% efficiency.

Figure 1 shows fixture tilted back in loading or indexing position. The fixture is counterbalanced to facilitate manual operation.

Figure 2 shows fixture in closed or broaching position.

This is but one of the many cases where "American" is adequately fulfilling National Defense requirements.

AMERICAN BROACH & MACHINE COMPANY
ANN ARBOR, MICHIGAN, U. S. A.
BROACHING MACHINES, PRESSES, BROACHING TOOLS, SPECIAL MACHINERY
Division of SUNDSTRAND MACHINE TOOL CO. ROCKFORD ILLINOIS U.S.A.

Wanted: Tough broaching jobs

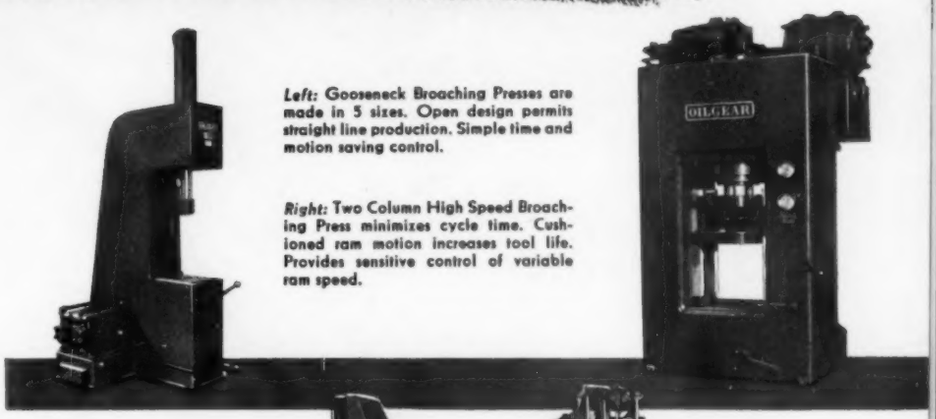
● Every year Oilgear broaching machines are adding more and more speed to production lines . . . and cutting production costs. Every year Oilgear broaching machines are solving new tough production problems. They are the product of unmatched hydraulic experience and continuing research, and they possess an enviable reputation where broaching methods are vital. They have played an important part in the development of modern broaching advances and in eliminating many seemingly permanent "bottle-necks" in modern production lines.

And now, the re-designed Oilgear Broaching Machines are licking tougher production problems than ever . . . are knocking costs per operation down to an unprecedented low.

Every Oilgear Broaching Machine has been definitely improved so that it is unusually convenient to operate; it reduces the operator's work and effort; it gives faster broaching and return speeds which are independently variable; it provides new tool and work capacities and new high standards of precision broaching.

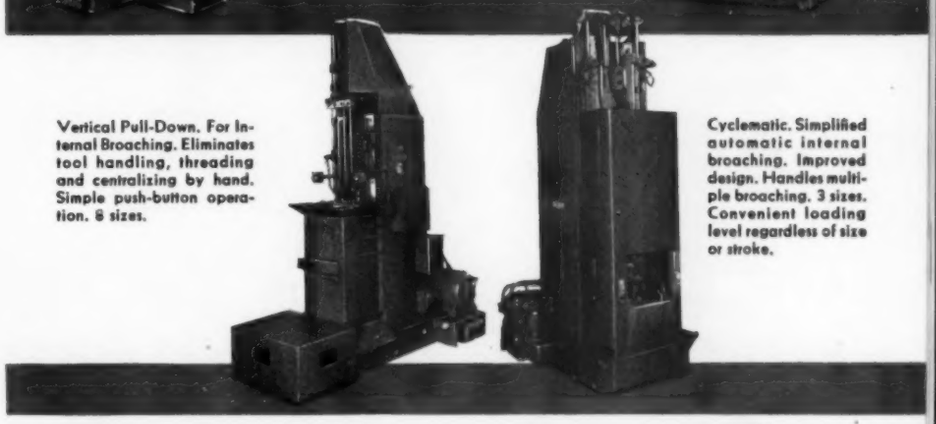
Regardless of the broaching operation, you can do it faster, more profitably and economically with Oilgear. We suggest you send at once for the new Oilgear Bulletins describing these improved machines in detail.

Use the handy coupon below. Send for any or all of these bulletins at once. Don't delay. They mean sizeable profits for you. THE OILGEAR COMPANY, 1323 W. Bruce Street, Milwaukee, Wisconsin.



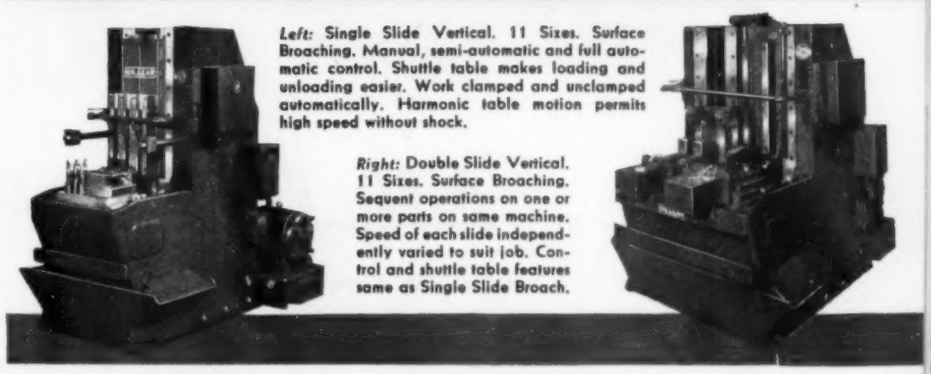
Left: Gooseneck Broaching Presses are made in 5 sizes. Open design permits straight line production. Simple time and motion saving control.

Right: Two Column High Speed Broaching Press minimizes cycle time. Cushioned ram motion increases tool life. Provides sensitive control of variable ram speed.



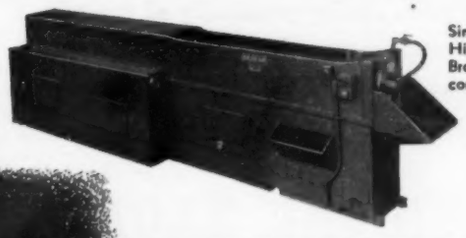
Vertical Pull-Down. For Internal Broaching. Eliminates tool handling, threading and centralizing by hand. Simple push-button operation. 8 sizes.

Cyclematic. Simplified automatic internal broaching. Improved design. Handles multiple broaching. 3 sizes. Convenient loading level regardless of size or stroke.



Left: Single Slide Vertical. 11 Sizes. Surface Broaching. Manual, semi-automatic and full automatic control. Shuttle table makes loading and unloading easier. Work clamped and unclamped automatically. Harmonic table motion permits high speed without shock.

Right: Double Slide Vertical. 11 Sizes. Surface Broaching. Sequent operations on one or more parts on same machine. Speed of each slide independently varied to suit job. Control and shuttle table features same as Single Slide Broach.



Single and Double Ram Horizontals. High speed, Internal and External Broaching; accurate, extra-convenient control and operation.

OILGEAR *fluid power* BROACHING MACHINES

FLUID POWER

Feeds • Pumps • Cylinders
Valves • Motors • Transmissions

OILGEAR

Trademark Reg. U. S. Pat. Off.

Horizontal and Vertical Broaching Machines • Horizontal and Vertical Presses • Custom Built Machines

THE OILGEAR COMPANY, 1323 W. Bruce St., Milwaukee, Wis.
Please send descriptive bulletin of the following new Oilgear Broaching Machines. (Check which.)

- ☐ XL & XB Horizontal Types
- ☐ XD & XS Vertical Surface Types
- ☐ PG Broaching Presses
- ☐ XP Vertical Pulldown
- ☐ XM Vertical Cyclematic

Name ..... *Title* .....

Company .....

Street .....

City ..... *State* .....

TWO WAYS
TO FINISH A HARDENED GEAR

Take, for instance, a 12" gear with a 2" face, hobbed with ample stock for the correction of both hobbing and fire distortion errors. Its final overall error must not exceed .001".

METHOD A:

SPUR GEARS ONLY

Hob • Harden Grind

TOTAL MACHINE TIME
204 MINUTES

METHOD B:

SPUR OR HELICAL GEARS

Hob • Shave Harden • Lap

TOTAL MACHINE TIME
104 MINUTES

AND THAT'S NOT ALL

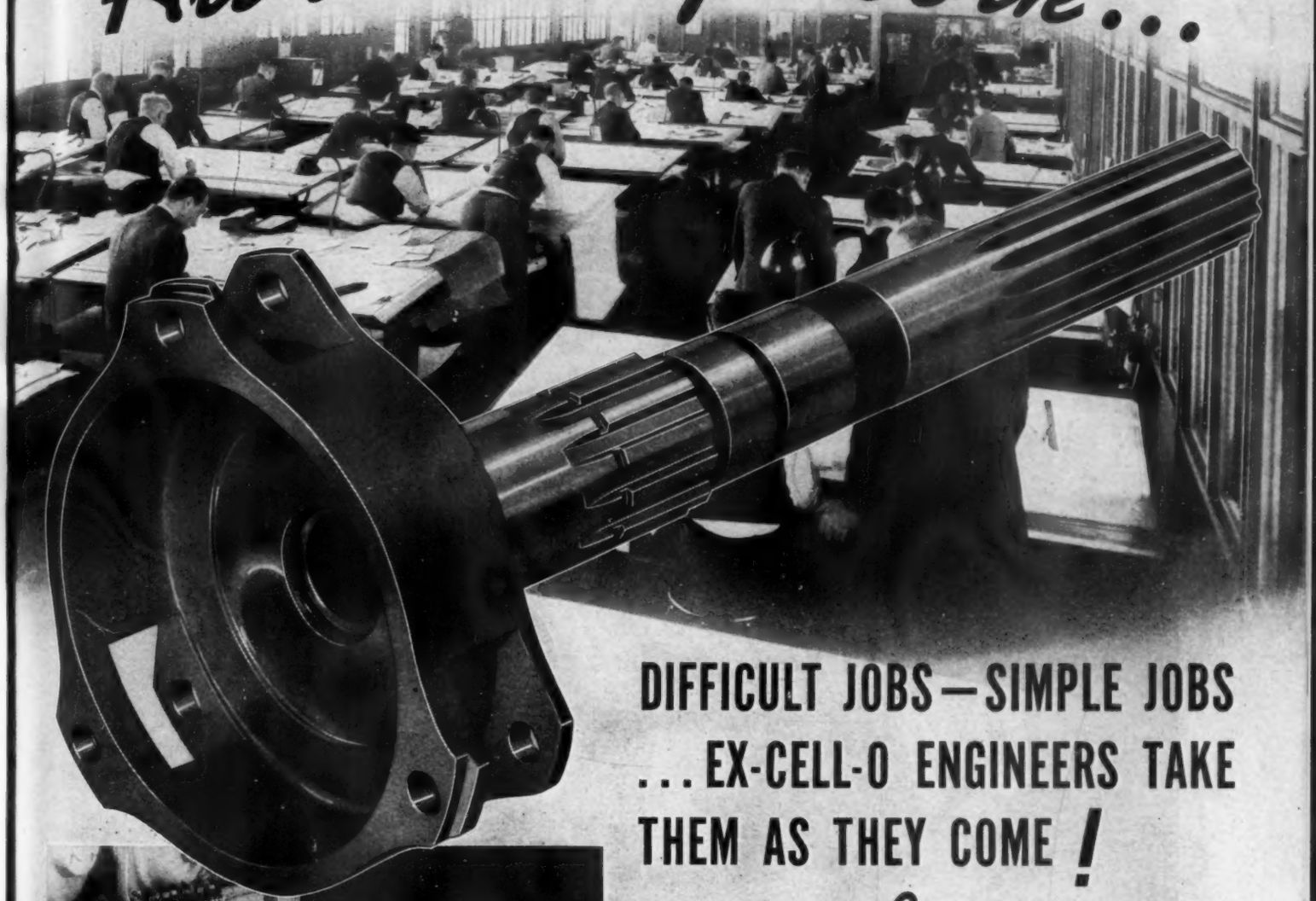
Method A is not only far more expensive but results in a high percentage of scrap due to surface checking of the teeth. It was abandoned years ago by practically all progressive automotive manufacturers and replaced by Method B which leaves the tooth surface unchecked and with a smoother, more accurate surface. Men responsible for production results are not inclined to do a job the wrong way, especially when it costs more.

Red Ring Gear Shaving and Lapping machines are found wherever modern gears are produced economically.

NATIONAL BROACH AND MACHINE CO.

5600 ST. JEAN • DETROIT, MICHIGAN

All in a day's work...



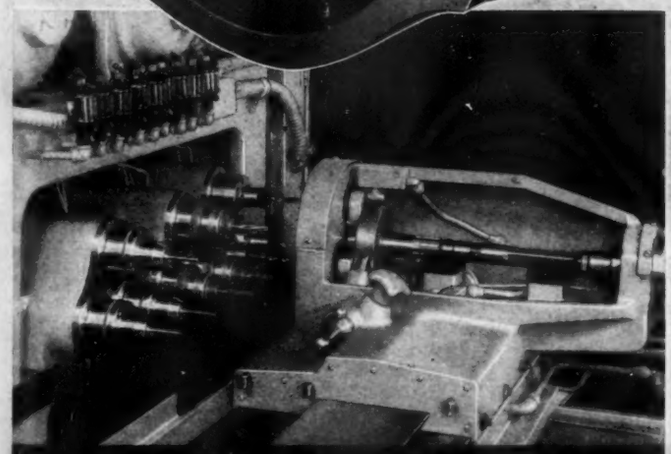
DIFFICULT JOBS—SIMPLE JOBS ...EX-CELL-O ENGINEERS TAKE THEM AS THEY COME!

PRODUCTION problems coming to Ex-Cell-O engineers from American industry in the course of a year are many and varied. Some are regarded by others as being so "tough" that they already are labeled as seemingly impossible. In almost every instance, Ex-Cell-O engineering experience and skill provide a practical solution by designing machines, fixtures, and tools to do a precision job...with a minimum of operations...on a money-saving, time-saving basis.

Other jobs are more simply solved, often by an application of a standard Ex-Cell-O precision machine and set-up that will at low cost give extreme accuracy and profitable production.

Whatever your metal-working problem in 1941 may be, if it is one requiring precision work, a good production rate, and profitable operation, it is to your advantage to consult Ex-Cell-O.

EX-CELL-O CORPORATION • DETROIT, MICHIGAN



One of the "tough" jobs recently accomplished by Ex-Cell-O engineers. Part is a heat-treated steel forging—a driven shaft used in new automatic transmission of nationally known automobile. On an Ex-Cell-O Precision Boring Machine (Style 112C) and especially designed fixture, holes for pinion gears are drilled, bored, and finish-reamed from the solid, with tolerances held to .0005", *and essential alignment satisfactorily maintained.* One Ex-Cell-O machine performs these operations, replacing four machines with four separate operations formerly required to do the job. The one Ex-Cell-O machine maintains the same total production as the four machines did before.

EX-CELL-O Precision MACHINES AND TOOLS

EX-CELL-O CORPORATION
1224 Oakman Blvd., Detroit, Michigan

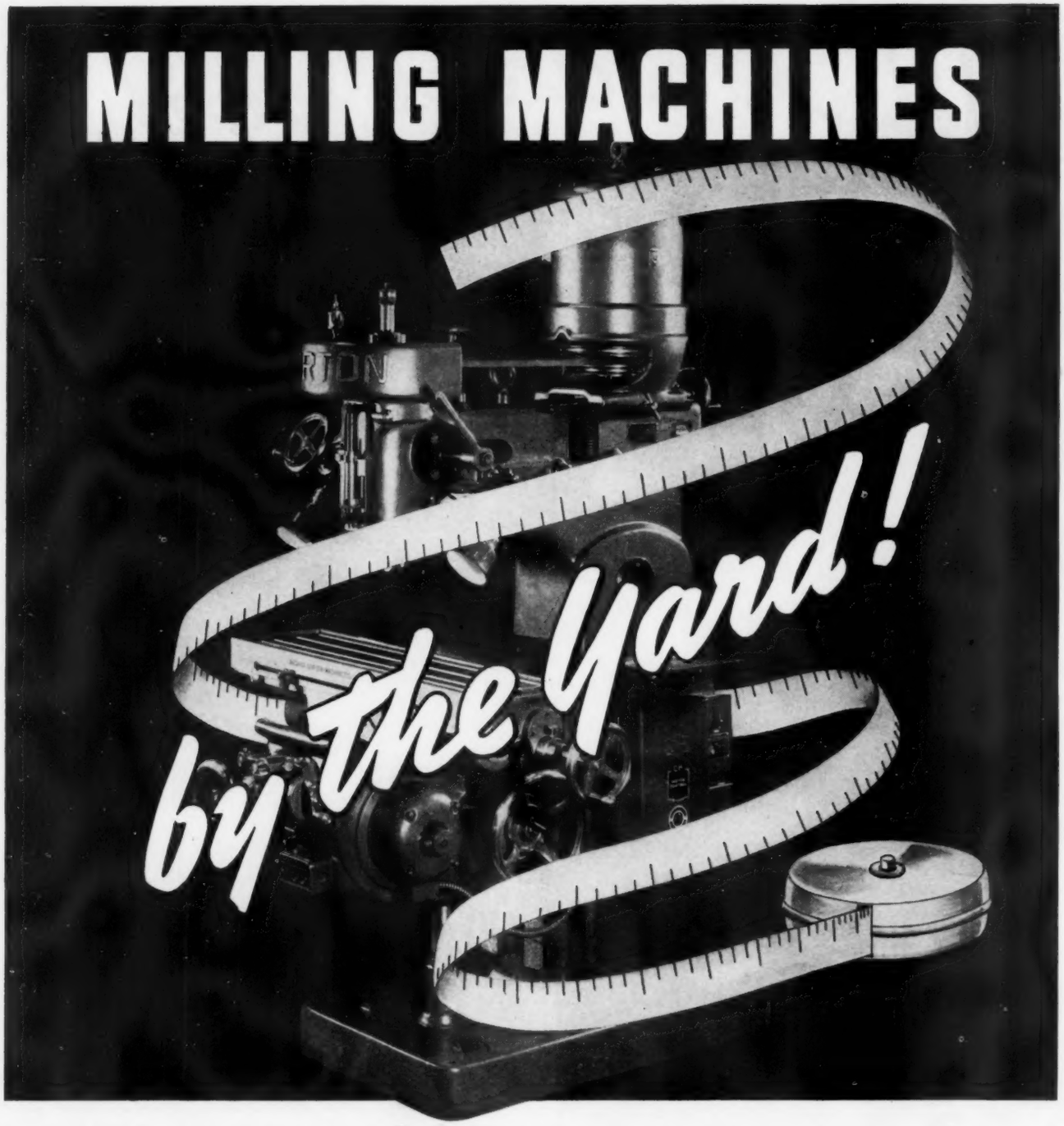
Please send bulletins on Ex-Cell-O Precision Boring Machines.

Name_____ Title_____

Company_____

Address_____

MILLING MACHINES



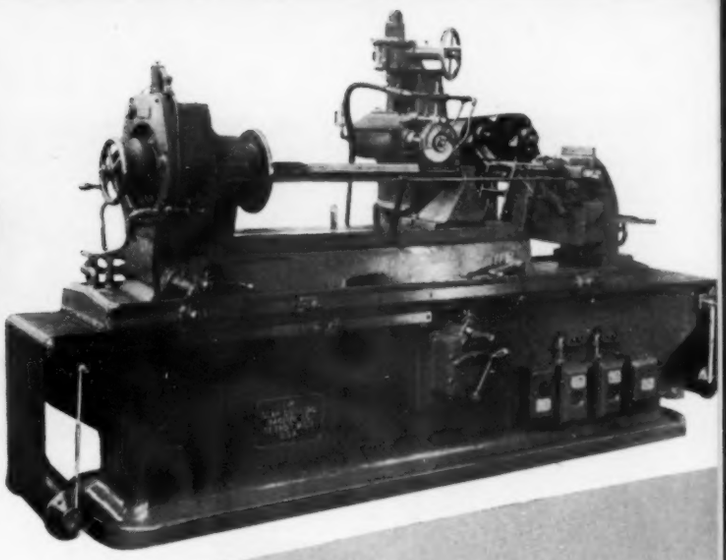
NOT quite, but when buying Gorton Super Speed Millers *you buy* only the speed ranges, feeds and other facilities needed. This means *important savings* to you. For instance, the standard Gorton Miller may be purchased *with* or *without* power spindle feed, power longitudinal and cross feeds, scales and verniers, dial indicators, coolant pump and other features. Write for Bulletin 1400-A.

REG. U.S. PAT. OFF. TRADE MARK GORTON RACINE, WIS., U.S.A.

GEORGE GORTON MACHINE CO.

1315 RACINE STREET, RACINE, WISCONSIN, U. S. A.

MACHINES FOR GRINDING Hardened GEARS SPLINES-RACKS



Capacities

EXTERNAL GEAR GRINDERS
Gear Diameters . . . 1" to 72"
Number of Teeth . . 3 to 358
Between Centers . Up to 80"
Face Width . . . . Up to 24"
Diametral Pitch . . . 32 to ¾
Any Desired Pressure Angle

INTERNAL GEAR GRINDERS
Gear Diameters . 3½" to 16"
Number of Teeth . 4 to 160
Face Width . . . . Up to 3"
Diametral Pitch . . . 24 to 4
Any Desired Pressure Angle

SPLINE GRINDERS
Spline Diameters . ½" to 6"
Number of Splines 3 to 160
Between Centers Up to 80"
These machines are adaptable for Straight or Involute Splines, Broach Grinders, Serration Grinding.

RACK GRINDERS
Rack Length . Up to 18"
Tooth Width . . Up to 4"
Diametral Pitch 24 to 4
Helix Angle . Up to 20°
Right or Left Hand
Any Desired Pressure Angle

Operation of all Gear Grinding Machines is semi-automatic. Pronounced smoothness results from use of a low-pressure hydraulic system. Special grinding problems invited. Please send us your prints.

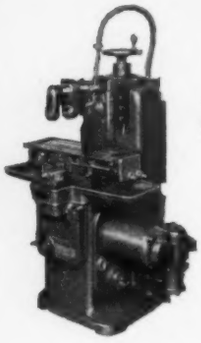
CONTRACT GRINDING

We maintain a Service Division for grinding External, Internal and Helical Gears, and Racks and Splines, on contract. Work accepted from all parts of the United States. Accuracy Guaranteed . . . More than 30 years' experience. Please send us your prints.

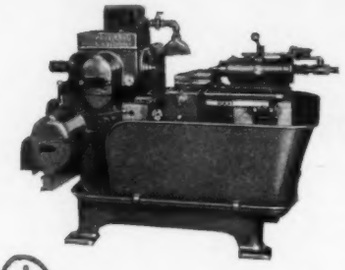
The MACHINE COMPANY

DETROIT, MICHIGAN

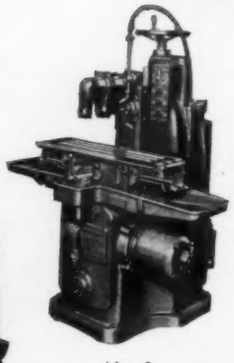
Sundstrand

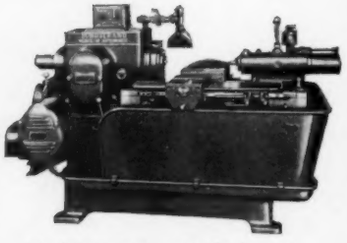


No. 00
Rigidmil

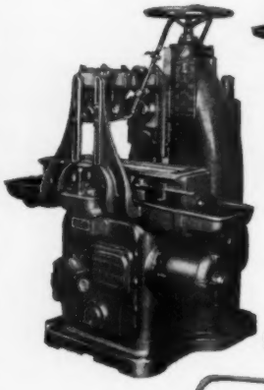


Model 8
Automatic
Stub Lathe



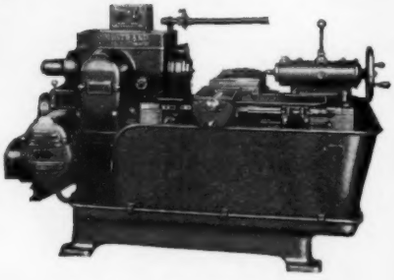


Model 10 Automatic Stub Lathe

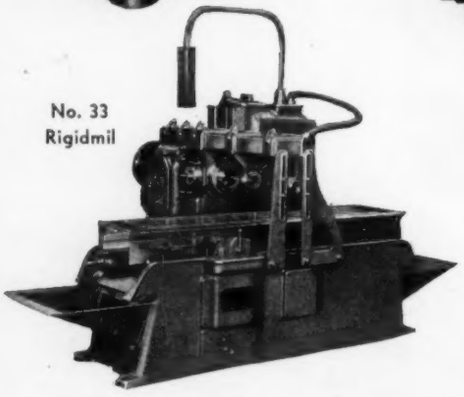


No. 0
Rigidmil

No. 1
Rigidmil



Model 12 Automatic Stub Lathe



No. 33
Rigidmil

Tool
Grinders

Illustrated Bulletins containing complete descriptions of any or all
Sundstrand machine tools will be supplied promptly on request.

SUNDSTRAND MACHINE TOOL CO., 2533 Eleventh Street, ROCKFORD, ILLINOIS, U.S.A.

Prays For Peace

IN a world of wars and rumors of wars . . . Sundstrand prays for peace.

¶ Rigidmils, Stub Lathes, Hydraulic Pumps, Fluid Motors, Tool Grinders, and other products of Sundstrand Machine Tool Company were created in times of peace, for peacetime pursuits. They pioneered in their respective fields, developed with and for Industry, made notable advances in the art of machining metals accurately, rapidly, and economically.

¶ Engineered Production always has been a specialty of this Company. Adaptability of design in our products, and the broad experience of our engineers have created an imposing roster of highly successful installations throughout the metal working industries. These range all the way through the alphabetical list, from the manufacture of airplanes and automotive vehicles to washing machines and other domestic equipment.

¶ The accuracy, speed, easy operation, stamina and other qualities which have made Sundstrand machine tools highly successful in usual commercial service are equally potent factors in their application to defense activities. The result is capacity operation of our organization and plants; with advance dating of scheduled production.

¶ Sundstrand prays for peace, prosperity, good will toward all men . . . and every member of our organization gladly makes this vow:

"I pledge allegiance to the Flag of the United States of America and to the Republic for which it stands, one Nation indivisible, with liberty and justice for all."

Sundstrand Machine Tool Co.

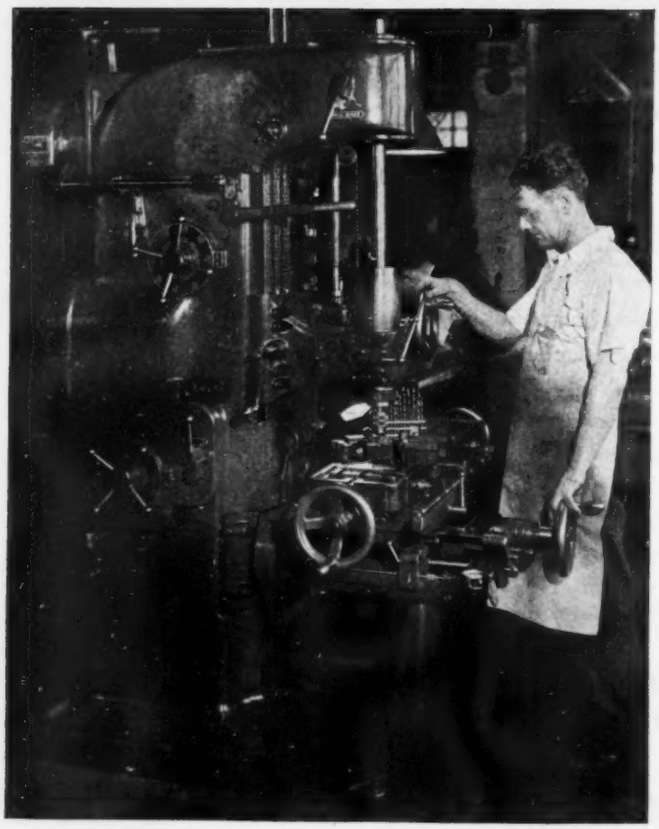
2533 Eleventh Street, Rockford, Illinois, U.S.A.

THE UTMOST EFFICIENCY *and* SAVINGS on the widest possible range of work

MINIMUM AMOUNT OF INVESTMENT IN SPECIAL EQUIPMENT *and* TOOLS

BIG SAVINGS IN SET-UP TIME *because of* UNIVERSAL TABLE CONSTRUCTION

The KNIGHT-MILLER - *AN ALL-PURPOSE MILLING MACHINE that can handle an exceptional range of* MILLING · · DRILLING · · BORING · · FACING · · ·



This versatile machine can take your job—in quickest time—with least amount of effort—with elimination of hours of layout time—with least effort for the operator—with highest quality results—with complete safety.

KNIGHT VERSATILE MILLERS ACCURATE RIGID

The KNIGHT MILLER is built fundamentally around the idea of versatility. It will not only do a wide variety and range of work but it does jobs fast and accurate—with the minimum amount of investment in special equipment and tools.

Plus its versatility, the KNIGHT MILLER has sufficient power to take reasonably heavy cuts —it has sufficient *rigidity* and *accuracy* to insure highest quality results—it has sufficient speed to make possible the use of both large and small cutters so that both light and heavy work can be done to equal advantage.

Internal and external milling is done at one setting. Step milling is made easy by getting vertical adjustment on spindle. Profiling, boring, and slot-milling is all done at one setting. Precision boring is done, using dial indicators for accurate locating. Rigid spindle makes possible deep end milling. Jig boring is possible because of dial indicators.

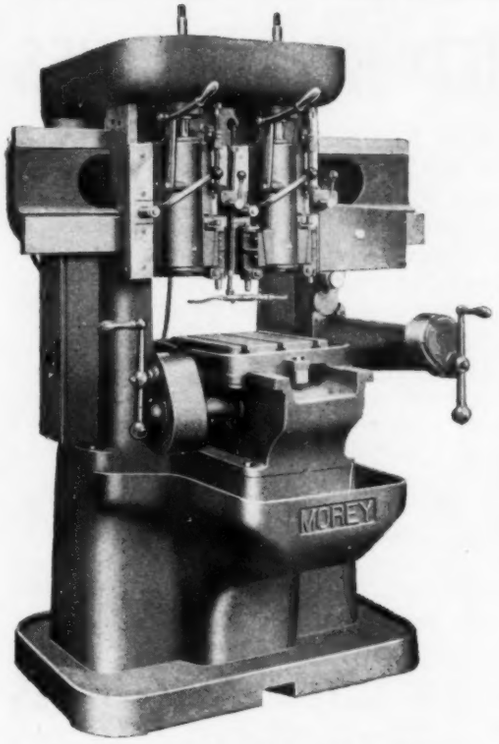
In looking for better profit advantages—for greater speed and for highest quality results, find out how the KNIGHT MILLER can help you.

WRITE FOR NEW CATALOG

W. B. KNIGHT MACHINERY CO.
• ST. LOUIS, MISSOURI •

MOREY MACHINES

FOR SPEEDY PRODUCTION!



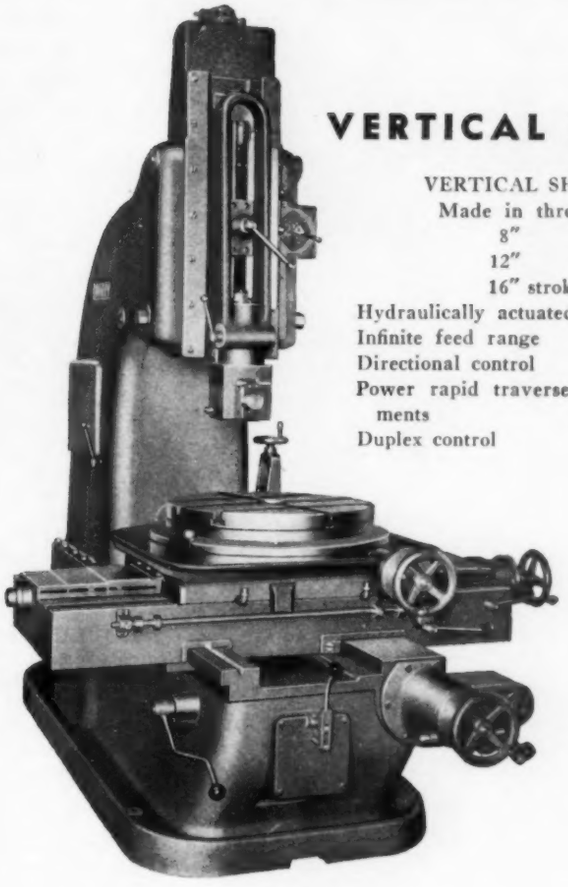
No. 12M HIGH SPEED VERTICAL PROFILER AND MILLING MACHINE

SINGLE and DOUBLE SPINDLE

EASILY OPERATED:

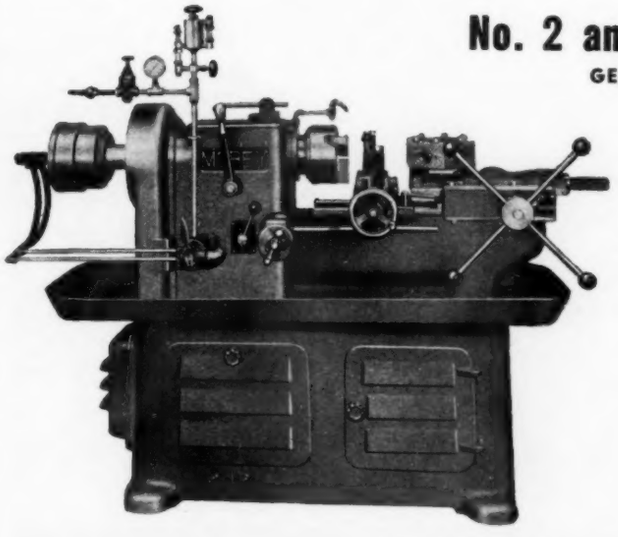
Unique cross-rail design eliminates vibration. Removable spacer for increased daylight space. Spindle speeds up to 3600 R.P.M.

Write for details and specifications of single spindle and two spindle types.



VERTICAL SHAPER

VERTICAL SHAPERS:
Made in three sizes
8″
12″
16″ strokes
Hydraulically actuated ram
Infinite feed range
Directional control
Power rapid traverse for all movements
Duplex control



No. 2 and No. 3 Turret Lathes

GEARED HEAD - PLAIN HEAD

NO. 2 TURRET LATHE:

Motor drive—1″ wire feed, 6½″ turning length.

Infinite spindle speeds—from 90 to 1800 or 180 to 3600 R.P.M. —enable this versatile Turret Lathe to handle a wide variety of bar stock and chucking.

Designed to obtain maximum efficiency from carbide or diamond cutting tools.

NO. 3 TURRET LATHE:

Motor Drive—1⅝″ wire feed, 9″ turning length.

Infinite spindle speeds—from 65 to 1300 or 90 to 1800 R.P.M.

Built with:

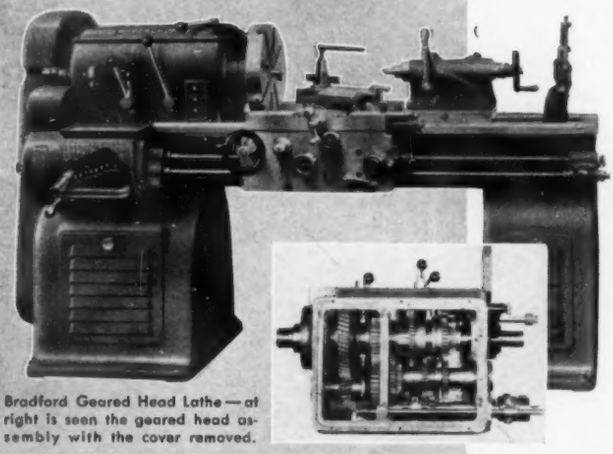
Hand operated cross slide and turret
Longitudinal power feed to cross slide
Universal type—power feed in both directions, to cross slide and turret.

MOREY MACHINERY CO., Inc.

410 BROOME STREET **NEW YORK, N. Y.**

FOR BETTER RESULTS...
SUPERIOR PERFORMANCE

BRADFORD
GEARED HEAD LATHES

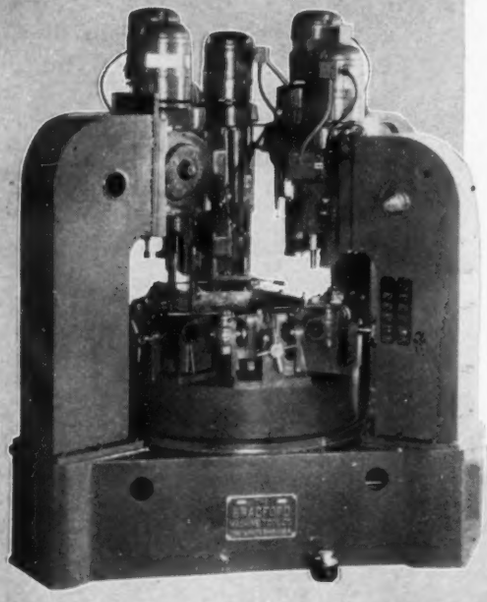


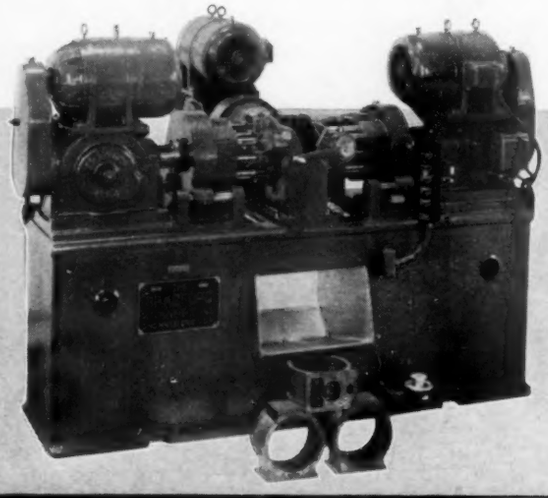
Bradford Geared Head Lathe—at right is seen the geared head assembly with the cover removed.

The lathe shown here is one of a new series recently developed by us. Behind its construction and design lies more than 55 years' experience building quality lathes . . . experience that has been incorporated in these units. From headstock to tailstock, every part has been tested under rigorous conditions in our own plant, and found to be completely satisfactory. No expense in time, money or effort has been spared to make these lathes the best that money can buy. Great power . . . assured accuracy . . . superior all-around performance is yours with a better Bradford unit. We fully guarantee this equipment and invite comparison and competitive tests. Bradford Geared Head Lathes come in 12″, 14″ and 16″ sizes. Our latest literature covers every point of these Geared Head Lathes' design and manufacture. Write for a booklet, study it over, then judge for yourself the savings these lathes can bring when put into service in your plant.

AUTOMATIC and SEMI-AUTOMATIC MACHINES

To meet present-day high production requirements of drilling, tapping, reaming, hollow milling, spot-facing, etc., Bradford Unit Type Heads, assembled on specially designed machines, are your soundest choice for quicker, more efficient production. Designed expressly for special use, these heads come in two types—a light duty, high speed unit for small work, and a heavy duty for larger work. Mount them vertically, horizontally, or at an angle—the production requirements of the part being machined are the only limits to the use for which these heads may be put. Shown here are two examples of Bradford design efficiency . . . special units that solved knotty production problems. Let Bradford engineers examine one of your more troublesome parts. Their valuable experience can help you cut costs and increase output in many phases of your production cycle. Write to Bradford today—they'll tell you how much faster and better you can do it with a Bradford installation!



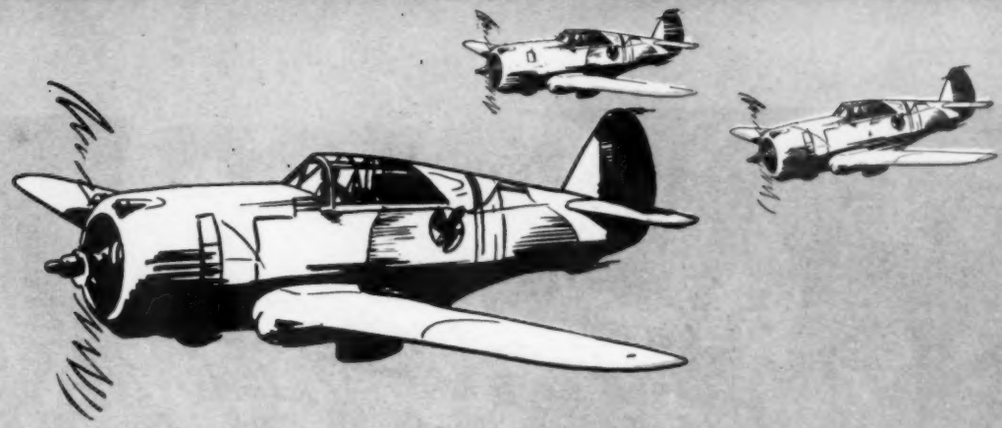


Above—A Bradford 5 Unit Semi-Automatic, manually operated. Job—transmission case. Production at 85% efficiency—240 parts per hr.

Right Bradford 3 unit—32 spindle drilling machine. Job—cast iron meter. Production—240 parts per hr.

PRECISION TOOLS
SINCE 1840
DEALERS WANTED
IN SOME TERRITORIES

THE BRADFORD MACHINE TOOL CO.
CINCINNATI, OHIO



CLEVELAND *Open Side* PLANERS

HELP FORTIFY THE AIR FOR NATIONAL DEFENSE

Accuracy is a first essential in producing parts for airplane production. Cleveland Open Side Planers are winning nation-wide approval in airplane construction not only because of their strict adherence to rigid tolerances but by speedy production.

Cleveland Open Side Planers are by design and construction particularly adapted to varied types of work and difficult planing operations. Moreover, all Cleveland Planers can be had with the new electric variable speed reversing drives.

The Cleveland Planer Company is justly proud of the record performances Cleveland Planers are making in production devoted to National Defense as well as peacetime needs. They will do equally as well on your work.

THE CLEVELAND PLANER COMPANY

Open Side Planers Exclusively Since 1900

3148 SUPERIOR AVE., CLEVELAND, OHIO

MEMO
from the Office of the Superintendent
In '41, I promise myself to take a second look at everything that will help the nation produce the material required in our national defense. I will not criticize as long as my production end lags behind
— A. H. J.
PEERLESS
PEERLESS

That's A Good Resolution, Mr. Superintendent!

And, we promise to tell you exactly what a Peerless will do on the new metals you will be called upon to cut during the coming year.

You can expect and get more out of a Peerless Saw because Peerless — with its 25 years' experience record — has the skill and facilities to build metal sawing machines that set the standards for comparison throughout industry.

Peerless is the only hydraulic saw equipped with a four-sided saw-frame — the frame that completely surrounds the blade and the work. This holds the blade with a tension and rigidity never before possible — prevents bowing — permits blade to lift and clear on every return stroke — and thereby lengthens blade life. All this adds up to 25% faster cutting in day-in-and-day-out production.

Let us submit cutting-time estimates.
Write for new Bulletin No. 50-A.

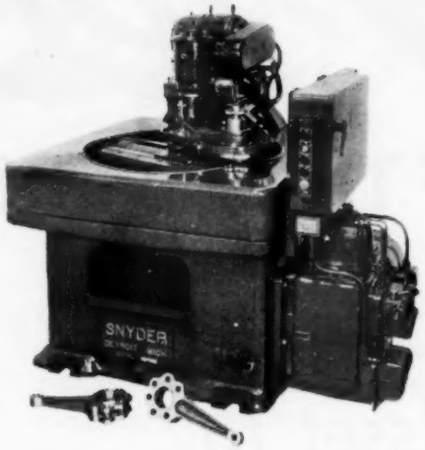
PEERLESS MACHINE COMPANY
RACINE, WISCONSIN, U. S. A.

FAST, ACCURATE CUTTING DEMANDS POSITIVE BLADE CONTROL

Peerless METAL SAWING MACHINES

See SNYDER

BEFORE YOU PLAN PRODUCTION SET UPS

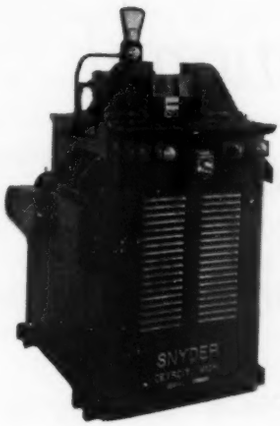


This Snyder Profile Milling Machine contour mills aircraft engine rods complete in 30 min., also suitable for articulated rods and similar contour milling operations by merely changing master cam.

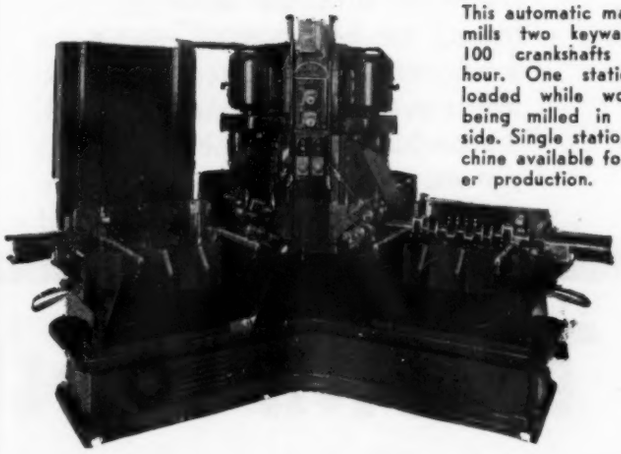
Special machine designed and built by Snyder for specific jobs increase production and cut the cost per piece.

Units shown on this page are examples of the wide variety of equipment built by Snyder last year.

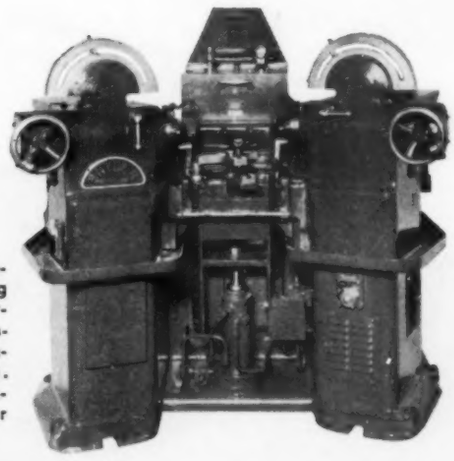
In 1941, let Snyder engineers submit proposals for special machines to help solve your production problems.



This Snyder Balance Milling Machine mills pistons to exact weight—*automatically*. Only human element consists of operator's adjusting piece in holding clamp.



This automatic machine mills two keyways in 100 crankshafts per hour. One station is loaded while work is being milled in other side. Single station machine available for lower production.



Connecting-rod balancing machine. Hydraulic operation with manual setting. Net production, 55 per hour.

SNYDER TOOL & ENGINEERING CO.

DESIGNERS AND BUILDERS OF SPECIAL MACHINERY

3400 E. LAFAYETTE ST. DETROIT, MICH., U. S. A.

Thompson Grinder set-up in the North American Aviation Plant

THE *Preci*

OF THOMPSON G

A Valuable Asset to National Defense Production

Grinding between cheeks of aircraft engine connecting rod

THOMPSON Grinders fit perfectly into the retooling programs for high speed munitions production. Engineered for extreme precision, Thompson Grinders perform with smoothness and power, and deliver an accurate output in both toolroom and

Grinding punch press die in tool room at Vultee aircraft

THOMPSON G

THE THOMPSON GR

SPRINGFIELD OHI

cision

N GRINDERS

production work — factors which make them ideal for heavy schedules. Illustrated on these pages are examples of Thompson Grinder applications to one phase of National Defense production—the manufacture of aircraft parts. In work of this type, which calls for speed, dependability and ease-of-operation, the following Thompson features are most valuable assets: vibrationless hydraulic power—massive column and bed—infinitely variable feeds and speeds—hydraulic rapid traverse —complete elimination of chatter and vibration by insulating the machine base by means of special vibration-absorbing rubber blocks in shear. Thompson Grinders are extremely responsive and sensitive time-and-labor saving machines which will perform with efficiency over an exceptionally long and profitable life.

Thompson Grinder in operation at Curtiss-Wright Plant

Thompson Grinder at Boeing Aircraft Plant

Grinding operation on aircraft landing gear part

GRINDERS

GRINDER COMPANY

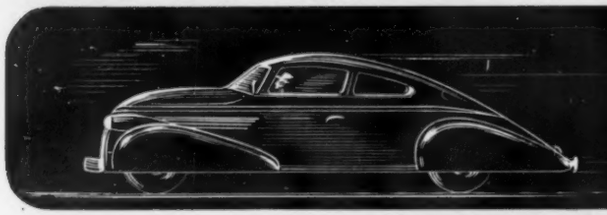
OHIO, U. S. A.

MICROFINISH

for combined accomplishment in one process

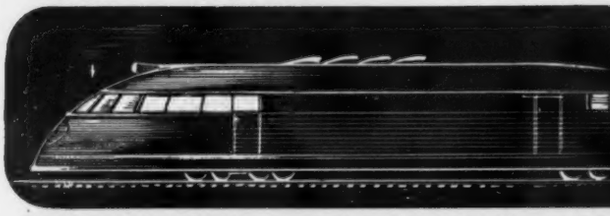
REG. U. S. PATENT OFFICE

ACCURACY

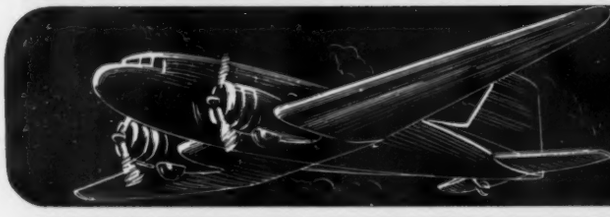


UNIFORM SIZE

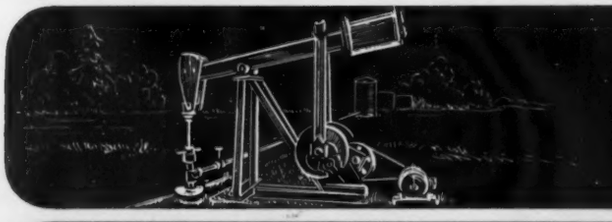
STOCK REMOVAL



SURFACE FINISH



PROCESS SAFETY



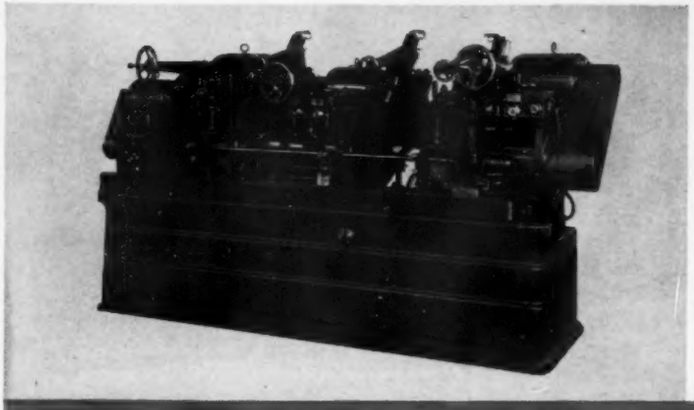
INTERNAL

EXTERNAL

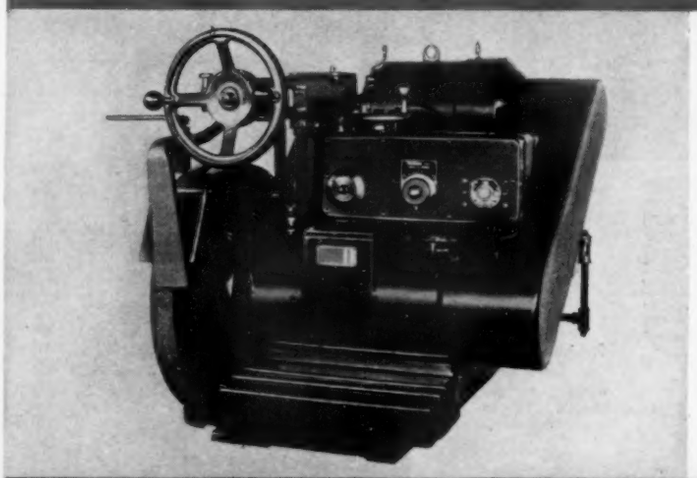
MICROMATIC HONE CORPORATION
7401 DUBOIS STREET DETROIT, MICHIGAN

FITCHBURG MULTIPLE PRECISION GRINDING

Saves Money, Man Hours & Spoilage on Mass Production Work



Special machines like these enable the precision grinding of two or more dimensions at a single handling. Grinding is all done within the time required for the longest single operation. On mass production work these savings rapidly repay cost of Fitchburg machines.



Standard Fitchburg Bowgage Head, self-contained grinding wheel units like this are built into these machines. Under vertical hydraulic pressure a laminated spring elongates, advancing grinding wheel to work. No backlash is possible. Rate of grinding wheel travel can be controlled to split .0001". If operations are discontinued, standard wheelheads can be remounted for other work.

On hundreds of parts like this for machine, automotive or ordnance work, Fitchburg grinding engineers can dig out "hidden profits" with the savings you can earn with multiple precision grinding! It will not obligate you to mail in your blue prints for study. New catalog shows wide range of other successful applications. Write for a copy today on your business letterhead.

FITCHBURG

GRINDING MACHINE CORPORATION
1701 Walnut Street · Fitchburg, Massachusetts, U. S. A.

MATTISON

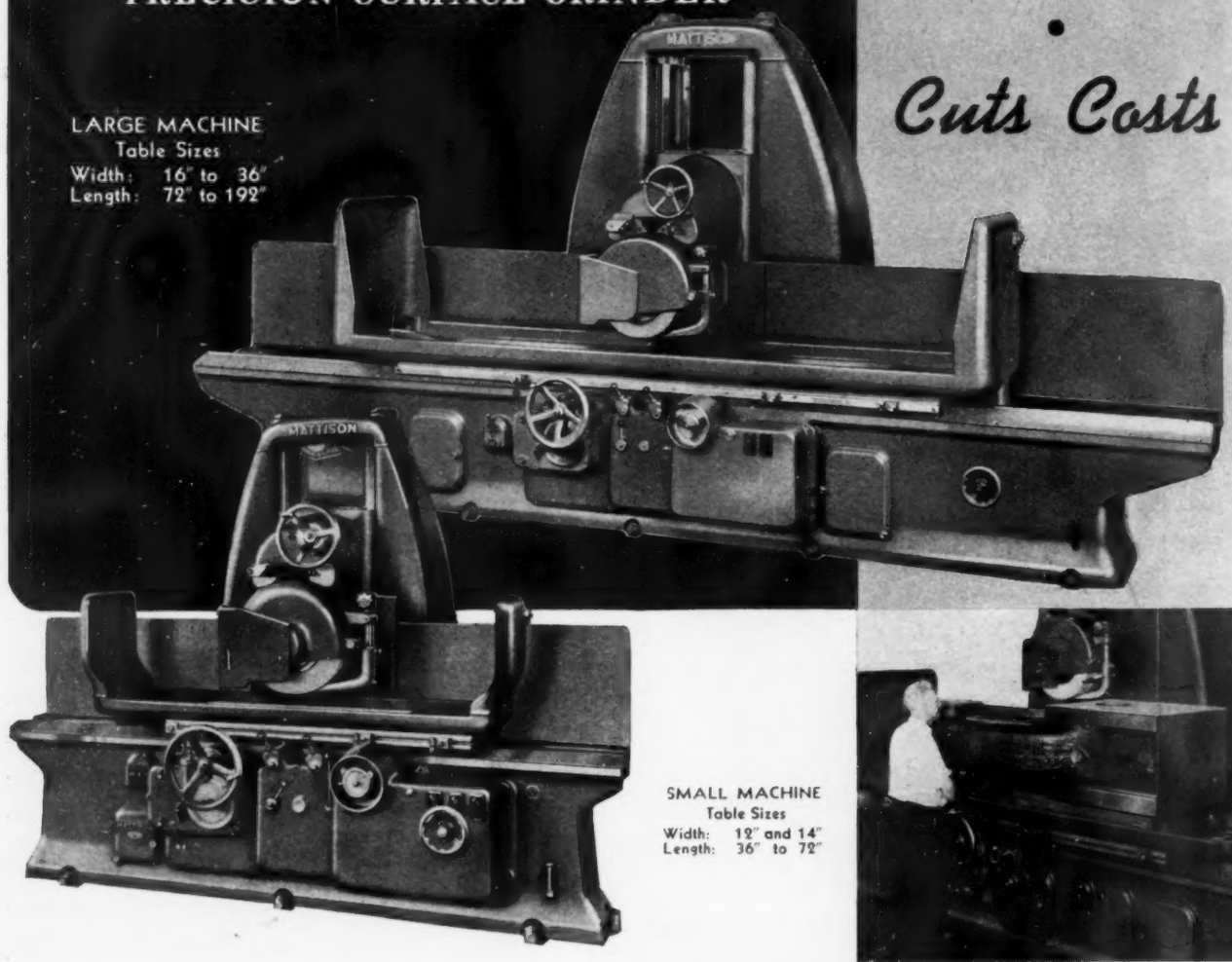
HIGH-POWERED PRECISION SURFACE GRINDER

SPEEDS UP PRODUCTION

•

Cuts Costs

LARGE MACHINE
Table Sizes
Width: 16" to 36"
Length: 72" to 192"



SMALL MACHINE
Table Sizes
Width: 12" and 14"
Length: 36" to 72"

3-ton heading slide formerly band scraped in 16 hours, now ground in 6 hours on Mattison Grinder.

Caps previously ground few at a time on small grinder. Now Mattison Grinder has reduced time from 7 hours to 30 minutes on quantity shown.

The Mattison High-Powered Precision Surface Grinder has massive double-column support for the wheel head; smooth, rapid, double-cylinder, hydraulic table drive; large capacity; ruggedness of construction and ample power for rapid stock removal.

Here is a great cost-reducing machine which provides precision grinding results on a high production basis. We will be pleased to furnish you with complete details regarding the advantages of the Mattison Surface Grinder as applied to your work.

MATTISON MACHINE WORKS—ROCKFORD, ILLINOIS

Put WALKER MAGNETIC CHUCKS ON YOUR MACHINES FOR MAXIMUM PRODUCTIVITY

Walker Universal Swivelling Magnetic Chuck—can be arranged with Vernier Heading—

No. 618 Rectangular Magnetic Chuck—available in sizes from 4" x 8" to 30" x 96".

No. 617 Bar Pole Face Rectangular Magnetic Chuck—for holding small thin work—Sizes from 6" x 10" to 12" x 60".

Walker Magnetic Face Plate, Style "D," with "Concentric Gap" for rotary Chucking. Rotary Chucks available from 4" to 72" diam.

THERE'S A WALKER FOR EVERY 1941 REQUIREMENT . . .

Grinding, milling, planing and turning operations can be handled with minimum set-up time and with elimination of spoiled work through the use of Walker Magnetic Chucks.

These units are available in a complete range of sizes for prompt shipment. Types include Rectangular, Swivelling, Vertical Face and Rotary and cover every need for efficient, economical, secure holding of work. Walker Magnetic Chucks will save you from 20-50% in chucking time.

With the completeness and diversity of the standard Walker line, as well as Walker facilities for designing special magnetic Chucks for various purposes, you are assured of getting the right chuck for your specific requirements.

Ask for circular W4

DEMAGNETIZERS

Walker Demagnetizers are available in D.C. and A.C. types for 110 and 220 v. They provide a convenient and highly efficient means for removing residual magnetism from a wide variety of work. Ask for circular K7.

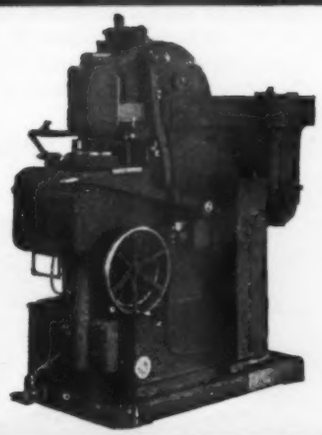
IMPROVED SURFACE GRINDER

EXTREMELY ACCURATE UNDER HIGH PRODUCTION

Explore the possibilities of the Walker Surface Grinder. This improved machine is highly productive, and amply powered, and can be depended on to make BIG SAVINGS on a wide range of work. It is extremely accurate, convenient in operation and easily adjusted. Work table assembly can be tilted as much as 5° for hollow grinding saws and cutters.

Lowering or raising wheel head automatically starts or stops table and magnetizes or demagnetizes magnetic chuck. Write for details of the many features offered.

Complete information on Walker equipment is available promptly on request.



O. S. WALKER CO., Inc.

WORCESTER, MASS., U.S.A.

STEP UP PRODUCTION

—Grind the

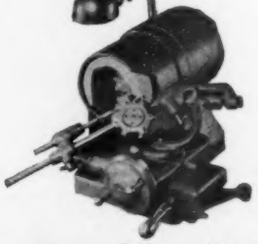
Big Ones

...and the *Little Ones* too

Sellers Drill Grinders

Shown above and at left is Sellers Model 6G Drill Grinding Machine — a wet grinder designed for grinding twist drills up to 3" diameter.

Sellers 4G Drill Grinder for grinding drills up to 3" diameter.



Sellers 1G Drill Grinder for grinding drills from .078" up to ½" diameter

on Sellers *Drill Grinders*

CHECK up on the number of man-minutes wasted each day by machinists having to stop production work to replace worn or broken drills. The figures will surprise you.

Tool engineers offer two suggestions to help you avoid part of this costly delay. First, select drills made of steels suitable for drilling your particular material at maximum speeds. Second, and equally important, *grind your drill points to the exact specifications recommended for drilling this material.*

More and more companies are using Sellers Drill Grinders to keep drills in condition for production work—and are finding that these grinding machines are better than average not only in grinding accuracy but in grinding speed and ease of handling, as well. A Sellers Drill Grinder can help you reduce this waste of man-minutes!

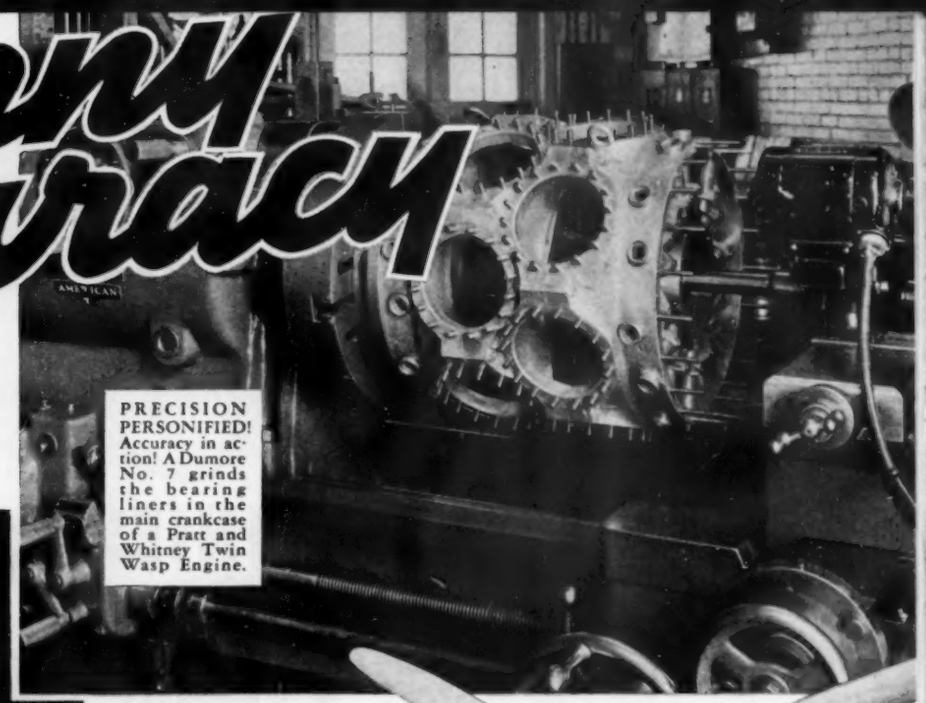
William Sellers & Company, Incorporated

1610 Hamilton St. Philadelphia, Pa.

FOUNDED SELLERS 1848

Sellers

Uncanny Accuracy

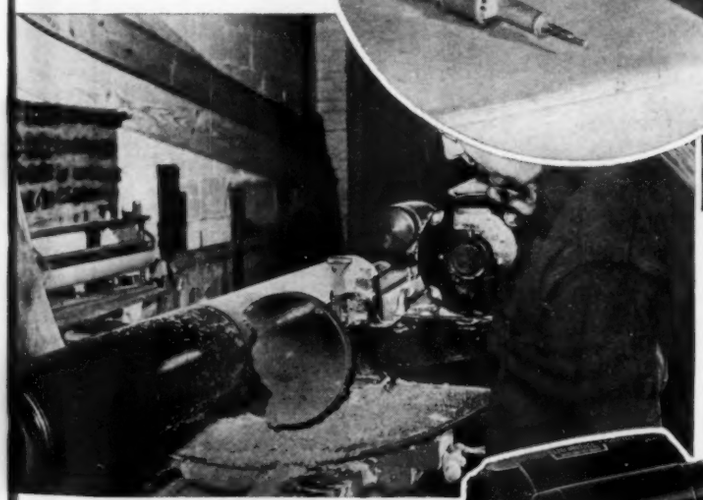


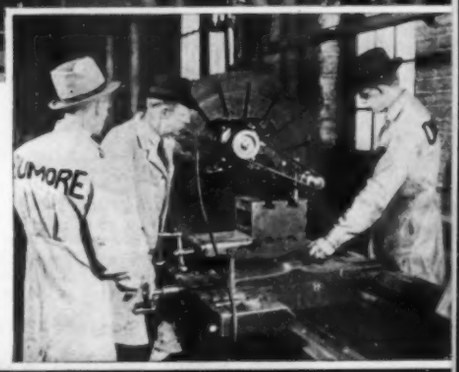
PRECISION PERSONIFIED! Accuracy in action! A Dumore No. 7 grinds the bearing liners in the main crankcase of a Pratt and Whitney Twin Wasp Engine.

A glamourous gown of cotton. Behind the scenes in the textile industries Dumore grinders will be found simplifying maintenance and reducing costs in many unusual ways.

Here are two Dumore No. 9 "Husky" hand grinders being used in production to smooth a surface weld on an aluminum window frame at the Orange Screen Company, Maplewood, N. J.

While the air hostess has played an important part in making air travel popular, Dumore precision grinders have contributed to the mechanical perfection that has brought safety to millions. (TWA. PHOTO)





Heavy grinding, internally or externally, to .0001" accuracy, is "right down the alley" for a Dumore No. 12.

A Dumore "Chief", with bakelite bond high speed wheel, re-surfacing a rubber printing roll at the George Lovelock Co., East Orange, N. J.

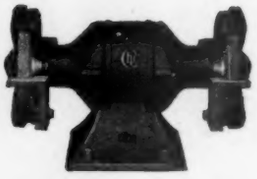
Dumore No. 12 "Chief"

Dumore has developed grinders of uncanny accuracy for the widest imaginable variety of applications. Your Dumore distributor will show you how to reduce your labor, spoilage, and overhead. Feel free to call on him . . . there's no obligation.

THE DUMORE COMPANY
DEPT. 131-A, Rracine, Wis.

Dumore PRECISION Grinders

Tool Post Grinder—With and without feed. Seven sizes ¼ to 3 H. P. Various types, for light and heavy work.



Ball Bearing Bench Grinders—¼ to 3 H. P. for grinding of all kinds.

PENNIES SAVED *are* DOLLARS EARNED

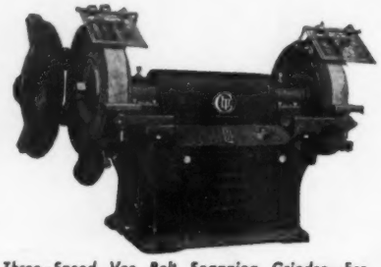
Portable Electric Drill—All sizes and types ¼" to 1¼" capacities. Universal motors for AC and DC.

Vee Belt Buffer—Buffers designed for the heavier polishing jobs on production work. Any spindle speed can be furnished.

Long after first costs are written off, THE CINCINNATI equipment will continue paying real dividends on your investment.

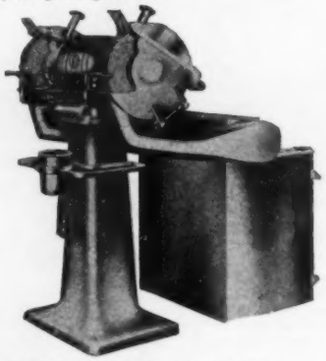
Regardless of your requirements, there is a tool in THE CINCINNATI line, designed and built to handle the most difficult job —and remember, THE CINCINNATI Engineers are ready and willing to help you solve those tough manufacturing problems, which crop up from time to time.

Get in touch with us today.



Three-Speed Vee Belt Snagging Grinder—For high-speed grinding. Three speed changes maintain efficient peripheral speeds for either vitrified or high speed grinding wheels.

Ball Bearing Pedestal Grinder—All sizes up to 10 H. P. for every grinding job.



Air Master—Attachment for any grinder or buffer to trap dust and grit. Protects worker's health and factory equipment.

Abrasive Cutoff Machine—Wet or dry type, for speedy cutting of metals of all kinds.

Electric Drills • Screw Drivers • Nut Setters • Tappers • Aerial Grinders • Tool Post Grinders • Bench and Pedestal Buffers • Bench and Pedestal Grinders • Abrasive Cut-off Machines • Routers • *Write for illustrated catalog of complete line.*

The Cincinnati

ELECTRIC DRILLS • GRINDERS • BUFFERS • PORTABLE TOOLS

The Cincinnati Electrical Tool Co.

DIVISION OF THE R. K. LE BLOND MACHINE TOOL CO., CINCINNATI, OHIO

2686 Madison Rd.

New Carbide Tool GRINDER

A New Low-Cost Delta Unit Designed Especially for Grinding Tungsten-Carbide Tools—Which for Convenience, Accuracy and Sturdiness Cannot Be Duplicated

Another Delta achievement—designed to insure accuracy and long life—manufactured by modern precision methods—so low in cost that it can be used in any shop, large or small. Equipped with one No. 60 Silicon-carbide wheel and one No. 120 grit Silicon-carbide wheel, the first for preliminary grinding—the second for producing a perfect cutting edge. So accurate is the machining on this grinder that it runs absolutely true, free from vibrations so that accurate, delicate grinding can be done. Point for point—including its surprisingly low price, massive design and construction—you will find this the best carbide tool grinder of this kind available today.

Specifications of Delta Carbide Tool Grinder

This new Delta grinder has 13½" x 8" Tables with ½" x 3/16" grooves for fixtures. Tables tilt 30° toward wheels and 45° away from wheel. Supplied with 1 No. 60 Grit and 1 No. 120 Grit Silicon Carbide Wheel. (Standard Diamond Wheels can also be used.) Speed: 3450 R.P.M. with surface speed of 5200 R.P.M. Furnished with 1 water pot and adjustable light fixture. Sub-base is removable for easy cleaning. Reversing switch built into base. Available with wide range of motors to fit all needs—in choice of bench or pedestal models.

Here are some of the Special Features

Reversible motor with self-sealed ball bearings—lubricated for life . . . removable sub-base so that sludge can be easily and quickly cleaned out . . . adjustable swinging light with definite stop so that wires cannot become twisted in conduit . . . reversing switch conveniently placed in front of grinder . . . available in both bench and pedestal models.

Send for Full Information

Fill out coupon below for full details, specifications and prices on this new Carbide Tool Grinder.

DELTA MFG. CO.

Delta Mfg. Co., (Industrial Division) 605 E. Vienna Ave., Milwaukee, Wis.

Gentlemen: Please rush to me full details and prices on the new Delta Carbide Tool Grinders. Also send copy of latest Delta Catalog of Industrial Production Tools.

Name .....

Address .....

City ..... State .....

Easy Adjustments adapt it to all kinds of work

The versatility of this modern unit recommends it for general work and for production work in single or multiple units.

Machine has a capacity of 8" round and 7½" square. A Special Holding Fixture enables multiple cutting to be done up to capacity of the machine. For instance, 3 pieces of round stock 4½" dia. can be cut at one time and smaller sizes in greater quantity.

Easy and simple adjustments can be made to accommodate blades of different thicknesses—a feature which makes it possible to use the most efficient blade for the type of work to be done.

Flexibility is provided by a friction feed which not only insures against blade breakage but which makes the machine adjustable to practically all cutting conditions encountered in the average shop.

Get all the facts about this new, modern, compact, versatile cold metal sawing machine. Write today for Descriptive Bulletin. Let us help you solve your metal cutting problems.

The **NEW 8"**

PORTER-McLEOD

COLD METAL SAWING MACHINE

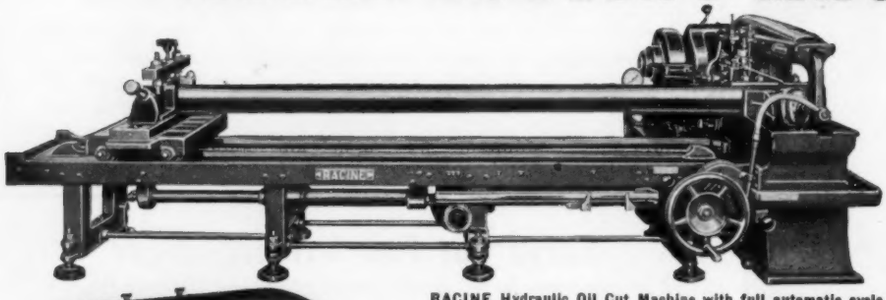
PORTER-McLEOD

MACHINE TOOL CO., INC.

HATFIELD, MASS., U. S. A.

High Speed **RACINE** *Hydraulic*

METAL CUTTING MACHINES

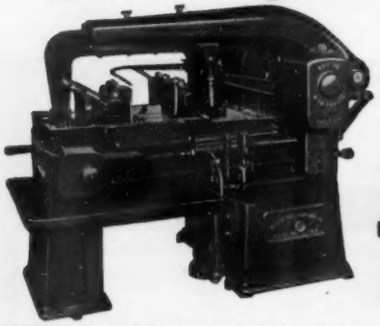


RACINE Hydraulic Oil Cut Machine with full automatic cycle —6"x6" or 10"x10" capacities.

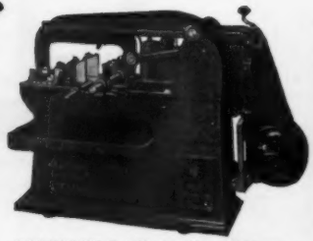
RACINE has always led the field—The most complete line —The most progressive in design—RACINE Machines are built for fastest work—Longest life—Machine tool accuracy.

RACINE alone has developed new simplified hydraulic feed and control—in its full range of sizes.

"Standard the World Over"



RACINE Heavy Duty Hydraulic Series. Fastest cutting for heavy bars, billets, die blocks. Single lever all front control. Capacities 10"x10" up to 14"x20".



RACINE Oil Cut Hydraulic—6"x6" capacity. A Fast cutting, accurate medium duty production saw. New in principle, modern in design.

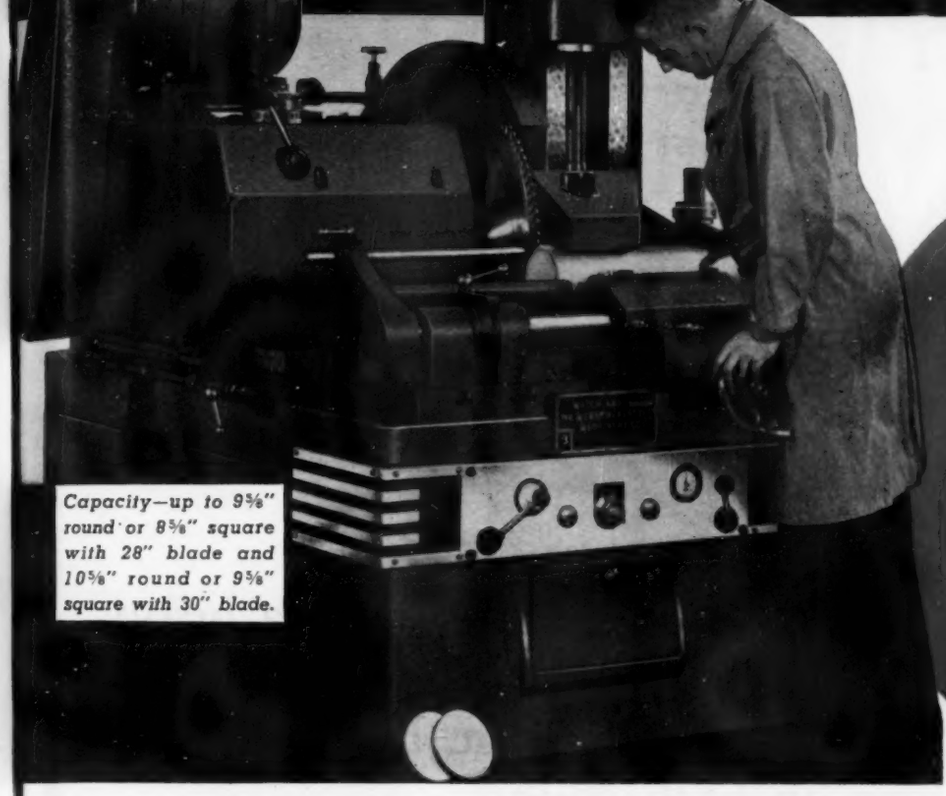
RACINE Hydraulic Utility Saw—Wet Cut—6"x6" capacity. Fast — Accurate — Low price.

RACINE Hydraulic Utility Dry Cut Saw—6"x6" capacity. Lower priced. A producer for the small shop; an auxiliary in the large.

RACINE TOOL & MACHINE CO.

1751 State Street **RACINE, WIS.**

This machine is ideal for cutting shell stock and other steels and for cropping the ends of shell forgings . . . The square, clean cross-sections will show imperfections in the material.



Capacity—up to 9⅝" round or 8⅝" square with 28" blade and 10⅝" round or 9⅝" square with 30" blade.

Now

AN AMERICAN-MADE COLD SAWING MACHINE *that gives*

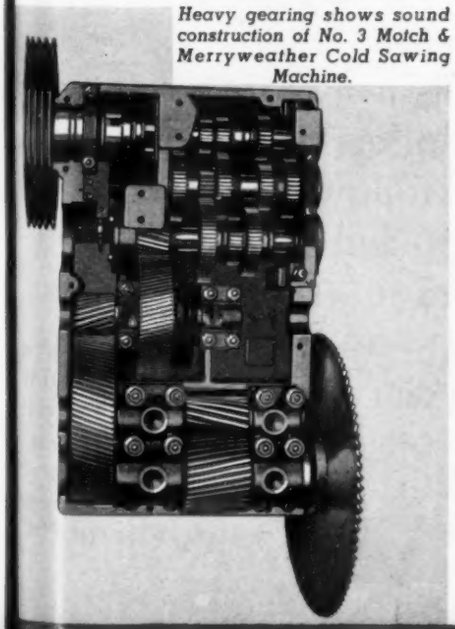
SQUARE CUTS

GREAT SPEED

NO BURRS

THE MOTCH & MERRYWEATHER

No. 3 HYDRAULIC FEED COLD SAW • • •



Heavy gearing shows sound construction of No. 3 Motch & Merryweather Cold Sawing Machine.

• The Motch & Merryweather No. 3 Hydraulic Feed Cold Sawing Machine embodies basic principles of design long accepted by the trade. To them have been added many refinements originated and perfected by our own staff. Rigidity and accuracy are combined with high production. Nine saw blade speeds range from 18 to 134 feet per minute. The Vickers hydraulic low pressure system is operated by a 2-hp. motor; the head, by a 10-hp. motor. Heat-treated alloy steel spur and helical gearing consume little power. Timken bearings, automatic oiling, twin-disc clutch, complete control, and correct belt tension are other features. Users in England, Canada, South Africa, and the East Indies, as well as the United States, prefer the Motch & Merryweather cold saw for its solid, square cuts without chatter or burr, its great speed, and minimum upkeep. *Note:* extra blades in standard 28" and 30" oversize are available. Write for complete descriptive bulletin.

THE MOTCH & MERRYWEATHER MACHINERY COMPANY

715 Penton Building • • • Cleveland, Ohio

Built by **MOTCH & MERRYWEATHER**

MOTCH AND MERRYWEATHER MACHINERY CO.
CLEVELAND DETROIT
CINCINNATI PITTSBURGH

Which Grinder Will Do YOUR Job Better ?

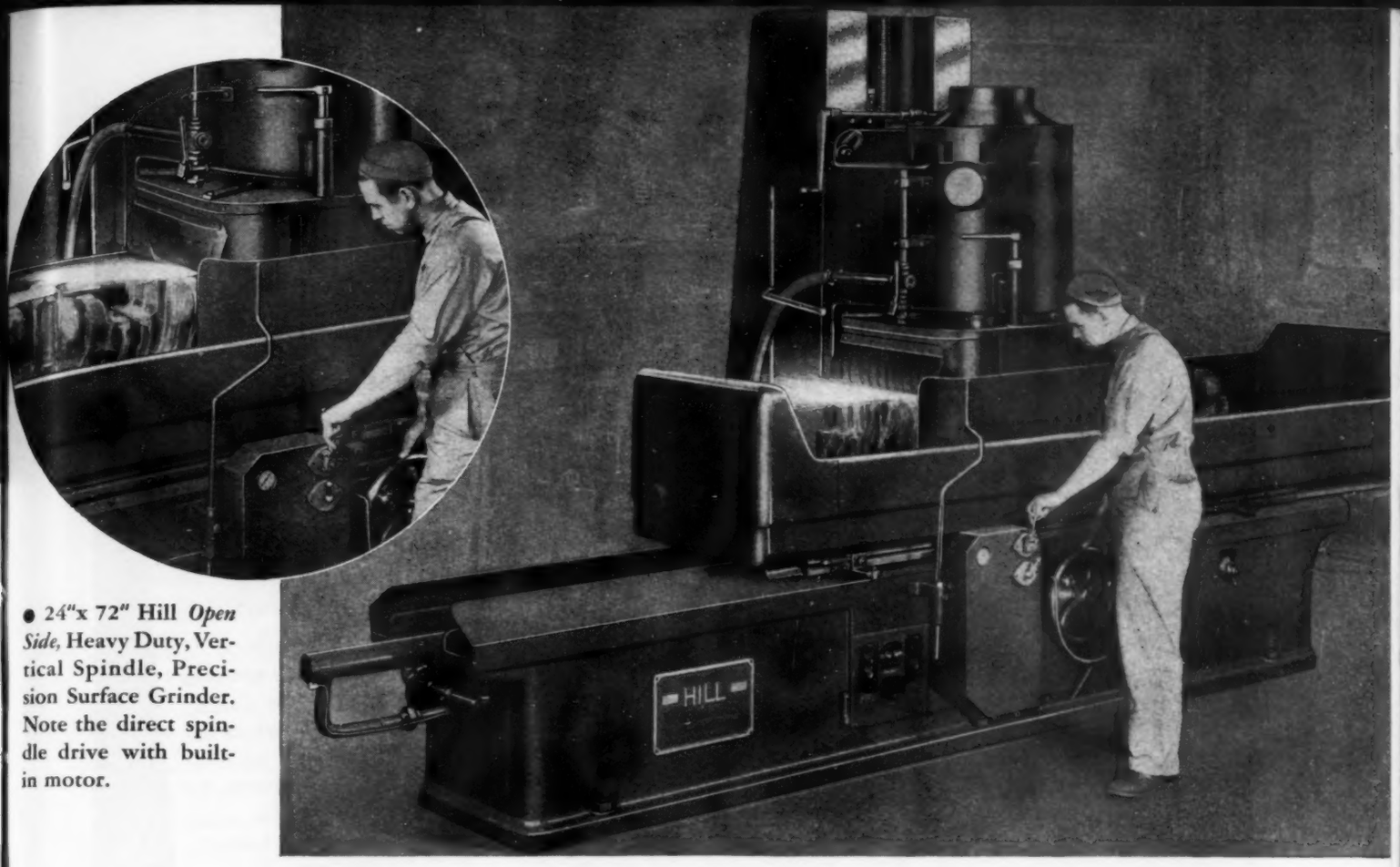
The two things most necessary in a heavy duty surface grinder are maximum speed of production and permanent accuracy of operation. Hill Grinders challenge competition on both counts.

Two distinct types are now manufactured in a full range of sizes, i. e., Horizontal and Vertical Spindle. Here are the ideal machines for single purpose grinding, production operations or general utility tools.

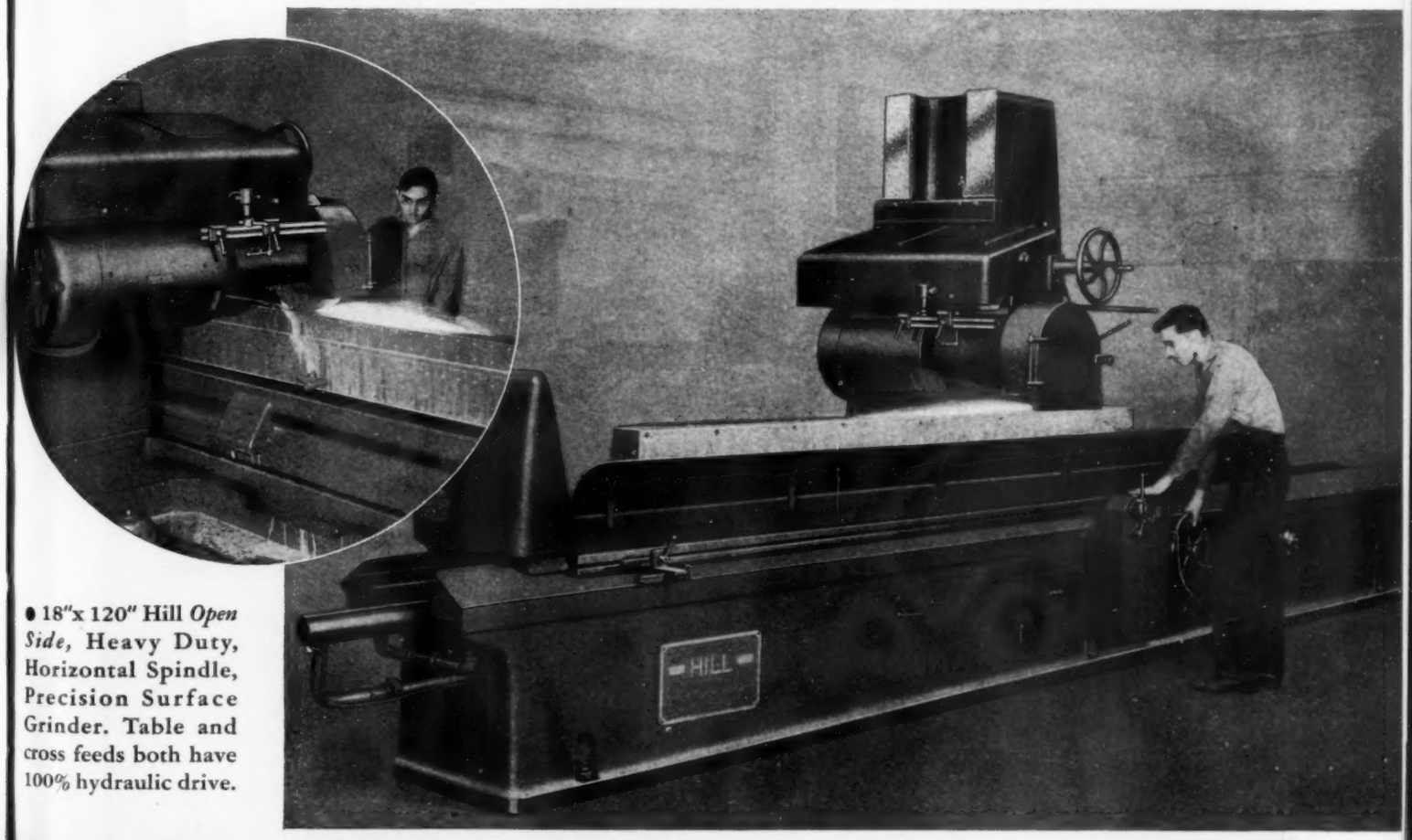
Both types are *Open Side* design with the famous HILL Hydraulic Table Drive, which operates at extremely low pressure, affording smooth, positive and economical operation. Table speeds are instantly variable up to 100 feet per minute • Both types have direct spindle drive with dynamically balanced built-in motors • Hill *Open Side* grinders are built in table widths as follows: **HORIZONTAL TYPE** 18", 24", 30"and 36". **VERTICAL TYPE** 18", 24"and 30". Table lengths range from 5 to 20 feet.

We invite you to get all the details given in Bulletin A just off the press. . . Send for it!

The HILL ACME



● 24"x 72" Hill *Open Side,* Heavy Duty, Vertical Spindle, Precision Surface Grinder. Note the direct spindle drive with built-in motor.



● 18"x 120" Hill *Open Side,* Heavy Duty, Horizontal Spindle, Precision Surface Grinder. Table and cross feeds both have 100% hydraulic drive.

E Co.

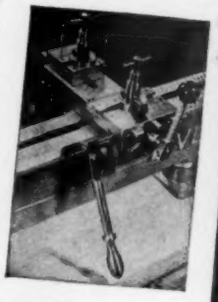
A consolidation of two nationally known, fifty year old manufacturers:—
The Hill Clutch Machine & Foundry Co. . . . and The Acme Machinery Co.
6400 BREAKWATER AVE • CLEVELAND, OHIO

RIVETT 918 HAND SCREW MACHINE

More Precision Work

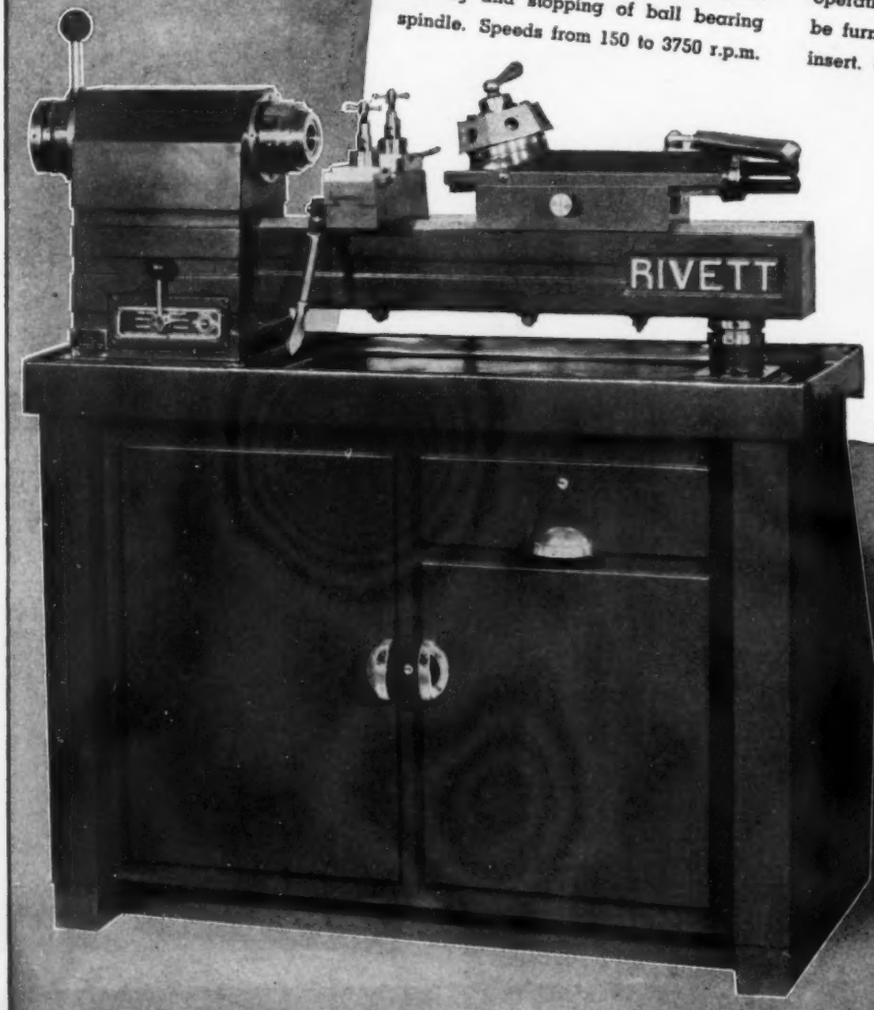
Duplicate Parts Rapidly Machined

The balanced design and operating features of the Rivett 918 hand screw machine make it an efficient producer on small precision parts. Work is accurately held in collet operated by rotary chuck closer with ball thrust bearing. Single lever controls lathe drive and automatic brake for quick starting and stopping of ball bearing spindle. Speeds from 150 to 3750 r.p.m. can be selected. Automatic indexing turret head revolves on roller bearings and is geared to independent stops. Cross slide carries tools for forming and cutting off. The machine is free from all vibration as it is properly proportioned and dynamically balanced throughout.



Parts requiring up to eight operations can be finish-machined at one chucking. Bar stock passed through spindle can be held in push-out collets up to 1" capacity while work individually chucked can be held in draw-in collets, step chucks or jaw chucks. If a turning operation is required, cross slide can be furnished with a parallel slide; see insert. Oil pump and piping is optional.

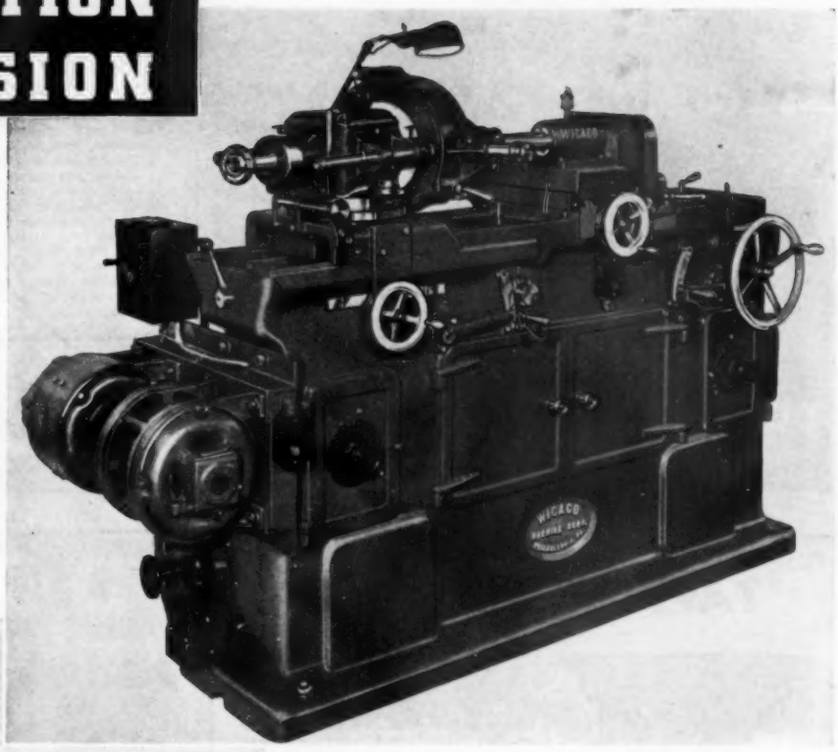
For complete information write for Bulletin 918



918 hand screw machine on metal cabinet with eight spindle speed drive.

RIVETT LATHE & GRINDER INC.
BRIGHTON, BOSTON, MASS.

WICACO MACHINE TOOLS *for* PRODUCTION *with* PRECISION



THE WICACO PRECISION INTERNAL GRINDER — For over 14 years, these extremely accurate machines have been economically producing for us, work requiring extremely close tolerances. While minor improvements on more recent models have increased their safety factor, and added to their convenience, basically they are the same machines that have given us exacting and faultless service . . . Features include Vibrationless Underslung Drive; Rigid Work-Head; Automatic Carriage Reverse; Carriage Stops graduated to .001; Shipped ready to hook up to current and operate . . . The Wicaco Precision Internal Grinder is very flexible and will add profitably to your tool room, assuring as it does, extreme accuracy and years of trouble-free operation . . . . Model illustrated is equipped with motor-generator for D.C. operation.

Write Today for Complete Details

THE WICACO CONTINUOUS OIL GROOVER has a productive value unequalled by any other machine on the market, both as to quality and quantity of work produced . . . . Work is loaded and unloaded without stopping machine, saving time and reducing unit cost . . . . Quick change-over makes this machine adaptable for short runs . . . Extensively used in grooving connecting rods, universal joints, retaining rings, shafts, etc. . . . The revolving spindle makes it possible to groove large, irregular pieces either internally or externally. When tool has reached its proper depth feed lever automatically returns to neutral position, saving time for removal of work from chuck. Produces up to 500 pieces per hour.

The

WICACO MACHINE CORP.

Stenton Ave. & Louden St.

Wayne Junction **Philadelphia, Pa.**

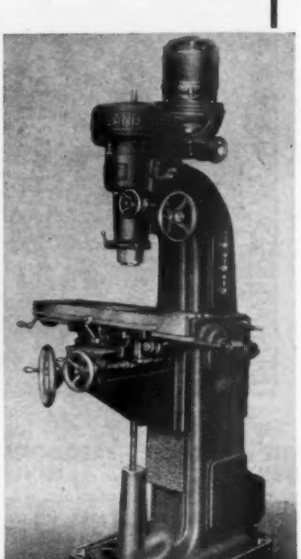
DOUGLAS HIGH-SPEED
Plain Miller

Automatic Longitudinal Feed. Spindle Speeds 90/1142 or 143/1815 rpm. Working Surface of Table 27-1/2" x 8".

Prompt Delivery

DOUGLAS MACHINERY CO., Inc.
150 Broadway, New York, N. Y.

NEW— THE CLEVELAND No. 1 VERTICAL MILLING MACHINE!



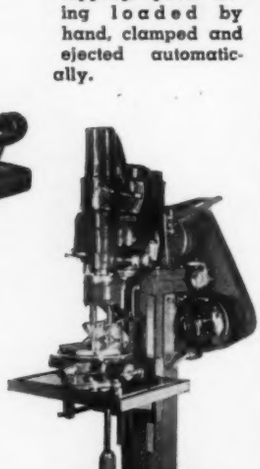
- *DESIGNED TO FILL THE DEMAND FOR A SMALL, RIGID, HIGH-SPEED UNIT*
- *BUILT TO GIVE RUGGED, LONG-LIVED, TROUBLE-FREE PERFORMANCE*

A completely new machine, designed specifically for the Tool Room and the Die and Mold Shop—that's the New Cleveland No. 1 High-Speed Spindle Vertical Milling Machine. Accurate in construction, and accurate in performance, this unit assures you superior work over a long period of usefulness. Features include: 18" longitudinal feed; 8"x32" working surface; twelve table feeds from .6" to 12½" per min.; choice of 2 spindle speed ranges; one—12 speeds, 100 r.p.m. to 1850 r.p.m.; two—12 speeds, 200 r.p.m. to 3700 r.p.m.; 1½ H.P. motor, and many other plus characteristics. You'll find, too, that this latest addition to our line of production machines is adaptable to countless operations. Write for information. Such a versatile unit can be of infinite value in every phase of your production.

The
SOMMER & ADAMS CO.
18511 Euclid Ave. CLEVELAND, OHIO

HI-DUTY PNEUMATIC
TAPPING MACHINES

Dial arranged for holding shells for tapping, parts being loaded by hand, clamped and ejected automatically.



No. 5-A Kaufman Tapping Machine arranged with two spindle head and No. 40 Index with dial fitted for parts to be tapped, can be used for a variety of work on castings, or for second operations on screw machine parts. Standard single spindle machines for tapping, and larger machines with two to twelve spindles can be furnished to do drilling, tapping, threading and machining operations. Send samples or blue prints for estimates.

L. J. KAUFMAN MFG. CO.
MANITOWOC, WISCONSIN, U. S. A.

DOUGLAS
UNIVERSAL SLOTTER 7

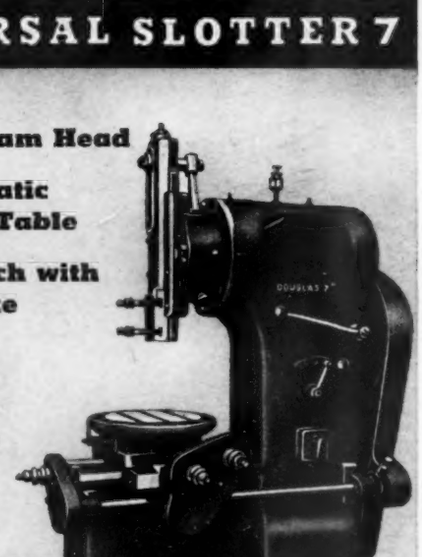
Swivelling Ram Head

Automatic Circular Table

Friction Clutch with Built-in Brake

For Die and Toolroom

Manufacture in large batches ensures Prompt Delivery

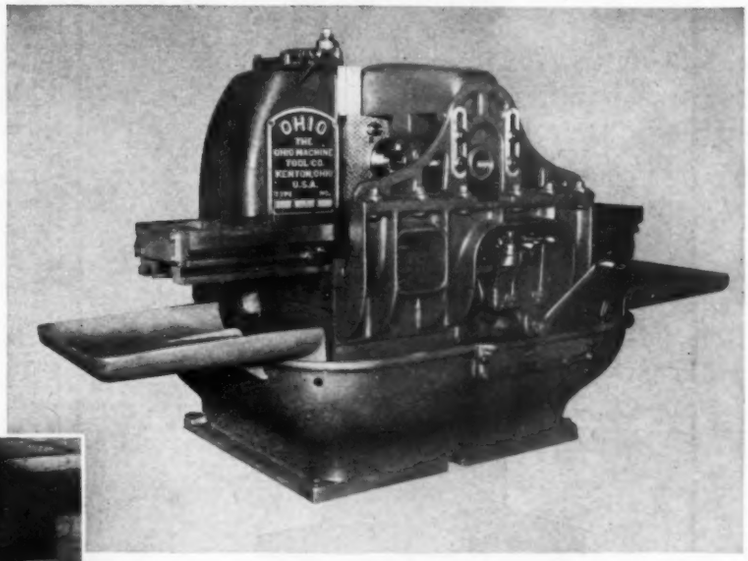


DOUGLAS MACHINERY CO., Inc.
150 Broadway, New York, N. Y.

OHIO offers 4 ways to boost '41 production

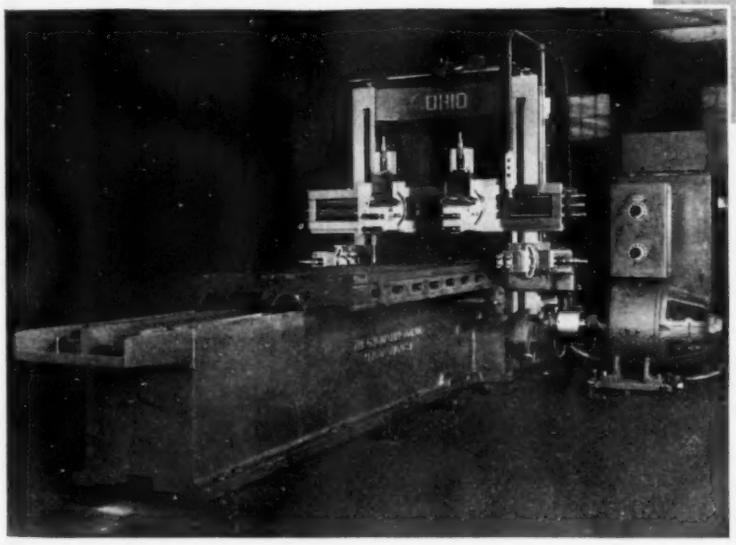
1 OHIO "Dreadnaught" SHAPERS

Built in a full range of sizes from 16" to 36" inclusive, Standard and Universal types. The 36" SUPER-DREADNAUGHT with a table surface of 30" wide by 48" long is in a class by itself, designed to machine large castings and forgings that would normally require a planer.



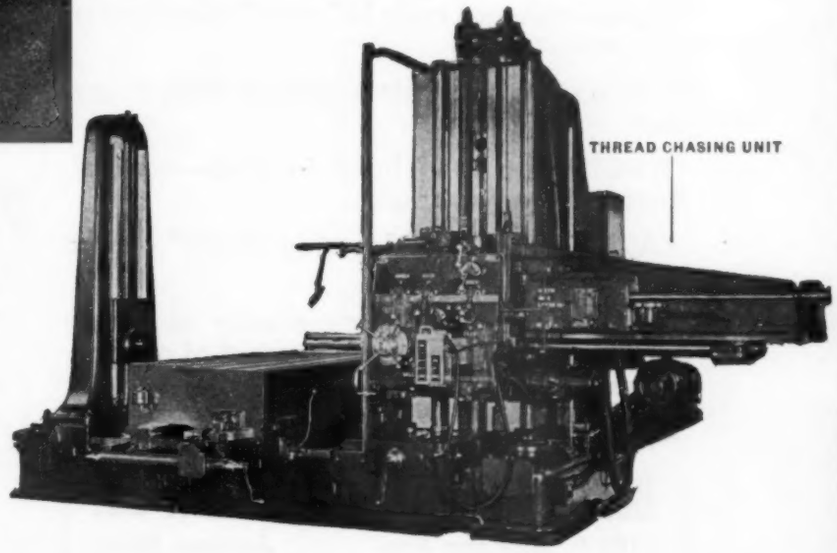
2 OHIO PRODUCTION MILLING MACHINE

The OHIO MILLER is designed for climb-cutting and production of small or large quantities. Convenience and accessibility speeds up production and makes it easy to set up for short runs.



3 OHIO METAL PLANERS

Plain Belt drive, Motor Drive on Housings or Reversing Motor drive in sizes 24" to 48" Widened are available to suit your Jobs or Shop Conditions. Direct Connected Reversing Motor drive is illustrated.



4 "Ohio Horizontal's"

Are Modern, Powerful, Accurate, Convenient machines built in a complete range of sizes in floor and table types.

Outstanding exclusive engineering features include Built-in Electrical power rapid traverse, magnetic multiple disc drive clutch with portable push button control, narrow guide for all moving units with opposed taper gibs, etc. aid production.

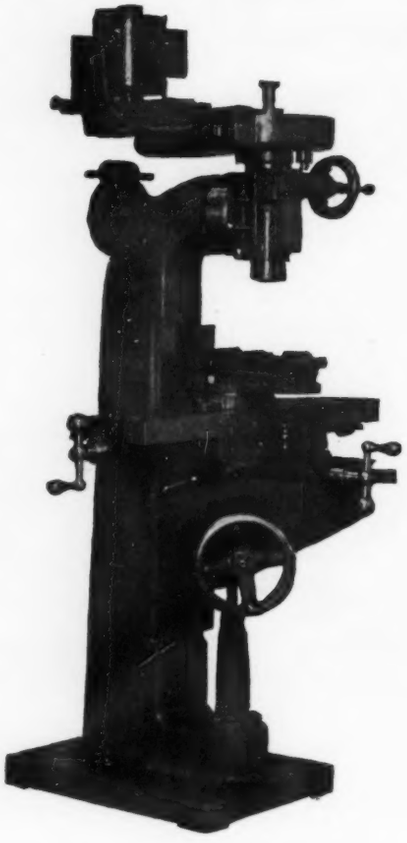
Write for bulletins explaining in detail the modern features of Ohio machines.

THE OHIO MACHINE TOOL COMPANY • KENTON, OHIO

MANUFACTURERS OF

"OHIO DREADNAUGHT" SHAPERS, PLANERS, HORIZONTAL BORING, DRILLING and MILLING MACHINES

BREAK THAT BOTTLE NECK IN YOUR TOOL ROOM with a



40-H INDEX

at one third the cost you have in mind.

IT MILLS slots, keyways, cavities, irregular curves with end mills ⅛" to ¾" diameter in tool steel.

IT DRILLS to accurate locations without layout.

IT BORES up to 3" holes in steel—vertical, horizontal or at angles.

HAS VERNIERS for locating 8"x16" at one setting.

The fact that we are constantly receiving repeat orders from users is proof of our machine's performance.

Write for details and quotation.

BLANK & BUXTON MACHINERY CO.
3100 E. Michigan Ave. Jackson, Mich.

This practical self-study and reference course in TIME AND MOTION STUDY

is now ready for you

Here's your opportunity to get the fullest, modern view of this great tool of industry, or to master any of its details . . .

. . . for your needs as a plant executive interested in its possibilities for improving production and lowering labor costs, or as a prospective or practicing time-study man.

From this book you can get everything necessary to develop a system that may be applied in any industry, using simple and inexpensive apparatus, securing quick results, and operating with minimum interference with production and workers' mental attitudes.

Just Out! *Revised 3rd Edition*

Time and Motion Study

By S. M. Lowry, Director of Public Relations, Procter & Gamble; H. B. Maynard, Pres., Methods Engineering Council; and G. J. Stegemerten, Westinghouse Electric & Mfg. Co. 432 pp., Illus., $5.00.

WITH this book the time-study man can check his methods, be sure he is following the most effective and advanced procedure. The reader preparing to take up time-study work can get complete training, from first fundamentals through every step of the complete process. Plant executives will find the facts they need to make best use of this industrial tool, in choosing a time-study man, in harmonizing his work with attitudes of employees, and determining how cost may be reduced.

This complete, illustrated manual shows you:—

—functions of time and motion study
—scientific fundamentals
—what makes a good time-study man
—equipment and how to use it
—how to make observations
—how to analyze the results
—how to standardize jobs, and set up formulas, etc.

Now meets needs of motion study men

Especially important in this edition is the greatly enlarged section on motion study, giving many details on analyzing the process and operations, eliminating unnecessary work and motions, and installing simple, practical work-reducing methods.

SEND THIS COUPON TODAY

McGRAW-HILL ON-APPROVAL COUPON

McGRAW-HILL BOOK CO.
330 W. 42nd St., N. Y. C.

Send me Lowry, Maynard and Stegemerten's Time and Motion Study for 10 days' examination on approval. In 10 days I will send $5.00, plus few cents postage, or return book postpaid. (Postage paid on orders accompanied by remittance.)

Name .....
Address .....
City and State .....
Position .....
Company .....A. 1-22-41

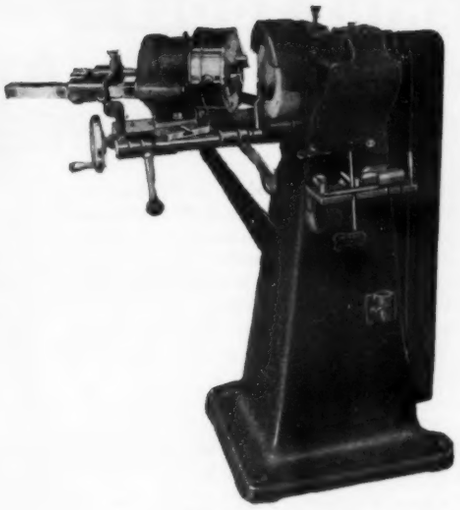
(Books sent on approval in U. S. and Canada only.)

High Production — Efficiency — Accuracy & Economy

In Manufacturing — All Begin In

THE TOOL ROOM

UNIVERSAL TOOL AND CUTTER GRINDER. (New Design) A Specialized machine for sharpening all types of cutters, reamers, spot facers, etc. Simple to set up —easy to operate—fast—efficient—accurate.



510 DRILLPOINTER. For drills ¼ to 3" diameter. Automatic operation — Any point angle 82 to 160 degrees. Variable clearances.

21 BENCH MODEL TWIST DRILLPOINTER for drills 3/32 to ½". Hand operated—easy to set up—easy to operate. Provides an accurate, free cutting drill.

ARC FACE MILL GRINDER. For cutters 6" to 26". Provides perfect radius on cutter blade—eliminates sharp corners. Assures free cutting blades.

Prepare Your Tool Room
for increased production;

Start in the TOOL ROOM with Oliver Tool Conditioners to reduce tool breakage; work spoilage; to obtain greater tool life; more pieces per grind and reduce machine down time.

You will get more out of your tools if they are ground the OLIVER WAY and *You will get more out of your machines* because tool breakage, inaccuracies and other causes of "down time" are far less frequent.

★ ★ ★

Today's requirements leave no room for *slow, costly, hand controlled* grinding *methods — replace* those worn out and obsolete machines that have served their purpose.

Send for Literature on OLIVER Drill Grinders, Face Mill Grinders and Tool and Cutter Grinders. No obligation.

OLIVER INSTRUMENT CO.

1414 Maumee St. • Adrian, Michigan, U.S.A.

Don't Neglect Your Tool Room. It's the Backbone of Production!

OLIVER OF ADRIAN

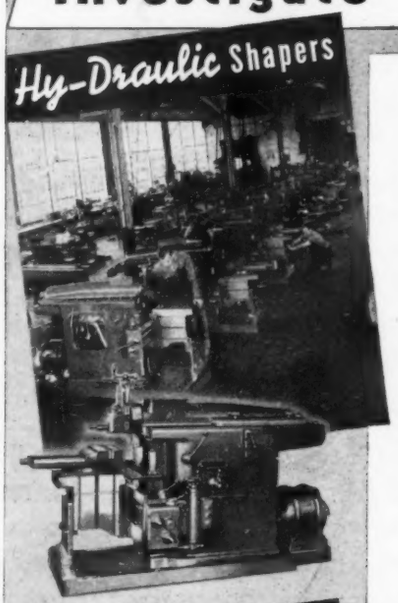
AUTOMATIC DRILL GRINDERS • TAP GRINDERS
TUNGSTEN CARBIDE TOOL GRINDERS • TOOL AND CUTTER GRINDERS • DRILL POINT THINNERS
DIE MAKING MACHINES • FACE MILL GRINDERS

RECIPROCATING

Hy-Draulic

MACHINE TOOLS

Investigate Their Exclusive Advantages



THE hydraulic drives and feeds of Reciprocating Hy-Draulic Machine Tools are pioneer developments which provide numerous exclusive advantages. These include uniform speed and pressure throughout the cutting stroke; infinite adjustment of feeds and speeds within wide range; instant shockless reversals; finer finish on work; unusual productive capacity and operating convenience.

Shapers—12" High Speed Shaper, fastest built, is described in Bulletin HS-8 . . . Standard Shapers, 16", 20", 24" and 28", give peak output and accuracy for indicated range; see Bulletin 401.

36" Openside Shaper is best for long, heavy shaping; has shaper speed, planer accuracy. Full details in Bulletin 382.

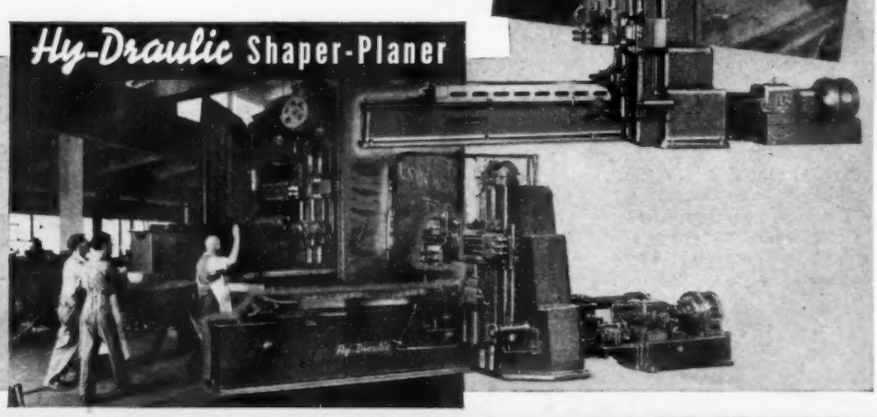
Slotter has 20" rating, 36" stroke, 41½" effective radius. Latest and most advanced tool of this type. Refer to Bulletin 404.

Shaper-Planers. For many jobs too big for shapers, too small for planers. Made in ratings from 66" to 144" stroke. Ask for Bulletin 3912.

Planers. Tremendously powerful, fast, accurate, smooth running. Openside Type shown at right, below; and in Bulletin 4011 . . . Double-Housing is described in Bulletin 395. Both types available in different sizes and lengths.

Investigate

Look into the advantages of Hy-Draulic Machine Tools, and anticipate your needs now to get suitable delivery. Bulletins listed above will be sent promptly upon request; and our engineers will gladly advise concerning specific applications. Write today.



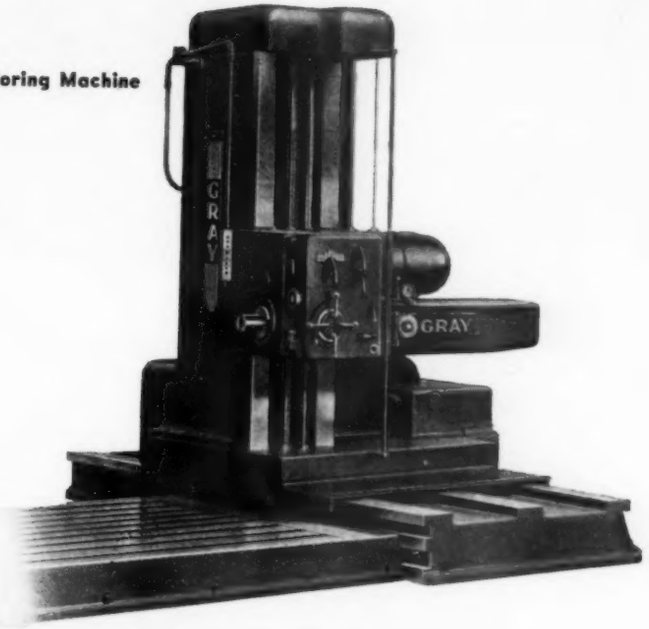
Hy-Draulic
Reg. U. S. Pat. Off.

Shapers . . Planers . . Slotters . . Shaper-Planers

ROCKFORD MACHINE TOOL CO.

ROCKFORD, ILLINOIS, U.S.A.

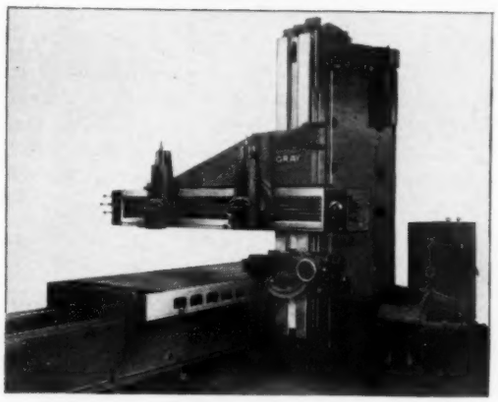
Horizontal Boring Machine



Speed up production and improve the Quality of your work with . . .

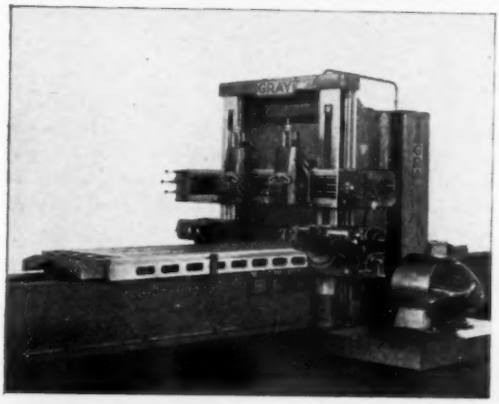
GRAY

PLANERS
MILLING PLANERS
MILLING MACHINES (Planer Type)
HORIZONTAL BORING MACHINES (FLOOR TYPE)



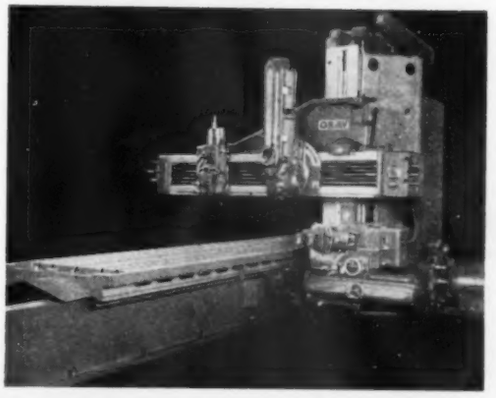
Openside Planer

Planer Type
Milling Machine



Double Housing Planer

Milling Planer



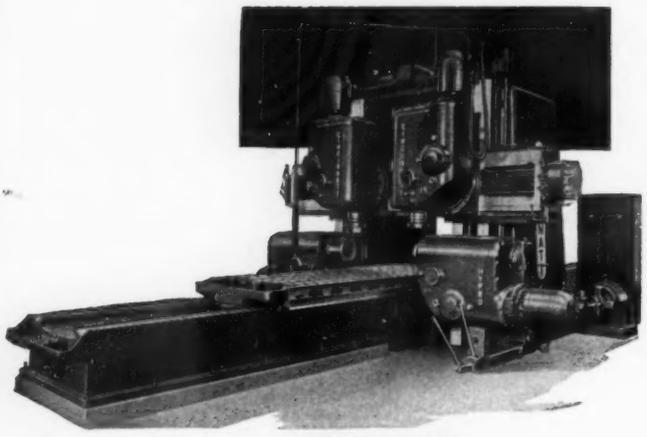
The G. A. GRAY COMPANY

3611 WOODBURN AVE.
CINCINNATI, OHIO

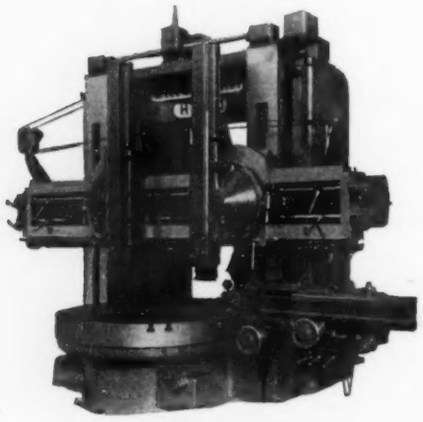
"PROFITS IN THE MAKING"

FOR 1941 *with* CINCINNATI TOOLS

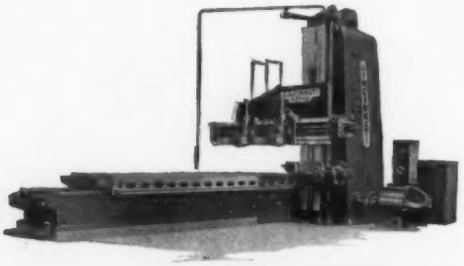
HYPRO PLANERS



HYPRO MILLERS



BORING MILLS



OPENSIDE PLANERS

DESIGNED for the most exacting service and built to "take it" under high production, continuous operation—Cincinnati Hypro Planers, Millers and Vertical Boring Mills can be depended on to deliver the goods—and cut both time and costs.

Sturdiness, adaptability and operating flexibility are combined in these machines to produce fast, accurate work. "Profits in the making" are assured in every shop that puts these modern machines to work.

HYPRO PLANERS

These machine tools are outstanding in their high productive capacity and are designed for the utmost rigidity in supporting both tool and work. With a range of table speeds from 8' to 240' per minute on cut and return strokes they are adapted to a wide range of work and assure maximum speed on any specific job. Smooth flowing power is assured by herringbone table drive. Side thrust pressures are eliminated.

HYPRO MILLERS

The new Cincinnati Hypro Planer Type Millers are designed with massive pyramid shape housings and with a table drive that delivers smooth flowing, efficiently transmitted power which is free from side thrust pressures. Milling heads are completely self-contained and Timkenized. Many other outstanding features are offered which command attention. Investigate NOW!

BORING MILLS

These modern units provide spiral bevel gear table, a completely Timkenized speed box as well as rail head saddles that are mounted in anti-friction roller bearings. Many other details of design and construction have been developed in these machines to assure high production, low operating cost, convenience and fast economical work. Explore their possibilities on your difficult jobs.

OPENSIDE PLANERS

These Cincinnati units are built in both openside and double housing types. Simple, convenient and trouble-free magnetic feeds are provided for all heads. Feeds are available in increments of 64ths from 1/64" to 1". Ask our engineers how you can eliminate bottle necks in your production and save money with these modern machines.

A Complete Line

CINCINNATI HYPRO MILLERS—Sizes up to 120".
CINCINNATI VERTICAL BORING MILLS—4', 5', 6', 7', 8', 10' and 12', also 10-16' Extension Mill.
CINCINNATI OPENSIDE PLANERS—30" to 120".
CINCINNATI DOUBLE HOUSING PLANERS—24" to 120".

Complete detailed specifications available on request.

THE CINCINNATI PLANER CO.

Cincinnati, Ohio

Tools and Accessories

TOOL AND WORK HOLDERS • STOCK FEEDS • MILLING, DRILLING AND GRINDING ATTACHMENTS • PUNCH AND DIE UNITS • COUNTERS AND TIMERS • CUTTERS, BROACHES AND LAPS • DIE HEADS AND TAPS • TOOL STEELS • MEASURING TOOLS, GAGES AND INSPECTION MACHINES • PORTABLE POWER TOOLS • HAND TOOLS

AMERICAN MACHINIST'S 28TH ANNUAL BUYERS REFERENCE NUMBER

Tremendous Trifles

GUN-SIGHTS gaged in micrometric scale . . . Diesel-engine injection valves machined to millimeter smallness . . . airplane propellers balanced to a fraction of an ounce. Tremendous trifles! — when translated into terms of results.

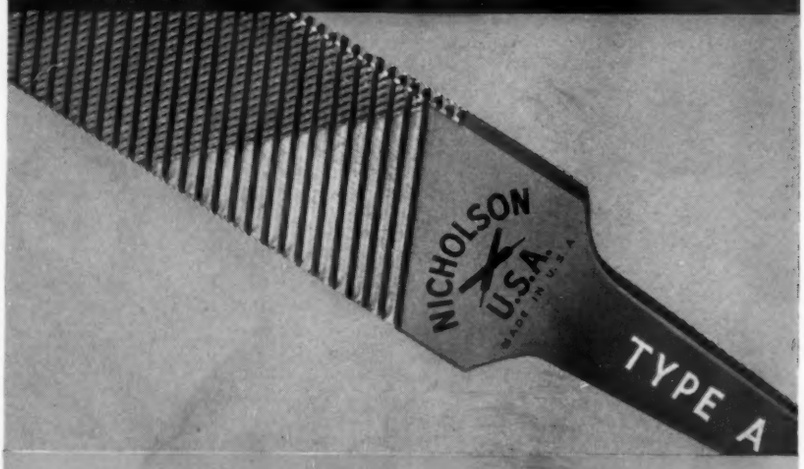
So, too, are the exacting structure and measurements of the teeth of Nicholson special-purpose files designed for specific results on specific metals . . . results in speed or efficiencies not consistently possible with general-purpose files.

Nicholson or Black Diamond Type A Aluminum files, for example: Microscopic examination reveals teeth which themselves have still finer teeth—saw-like edges (invisible to the naked eye) which break up the ductile-metal filings and prevent chatter. "Open throat cut" further enables this file to clear itself. Faster metal removal, more accurate finish—*better products*—are inevitable!

Such are some of the infinite pains taken to give long-life efficiency to the many specialized files designed by file specialists . . . and to enable this, the world's largest file manufacturer, to guarantee *Twelve perfect files in every dozen.*

TYPE A ALUMINUM **files are made in Flat and Half-round shapes, 6" to 16" in length—and all in one degree of coarseness.** ***Free Technical Bulletin gives further information.***

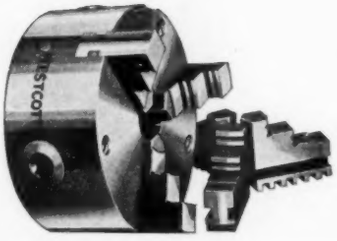
NICHOLSON FILE COMPANY, PROVIDENCE, R. I., U. S. A.
(Also Canadian Plant, Port Hope, Ont.)



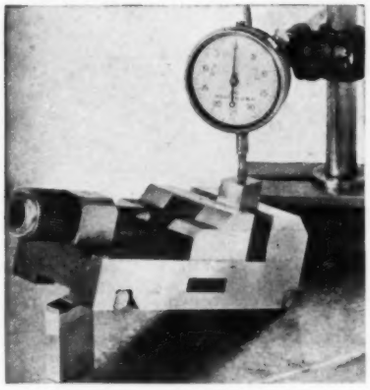
NICHOLSON FILES

FOR EVERY PURPOSE

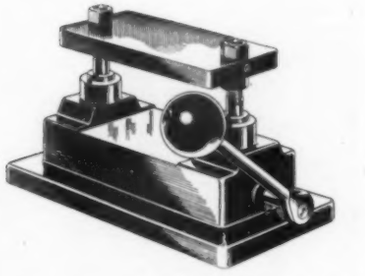
TOOLS and ACCESSORIES



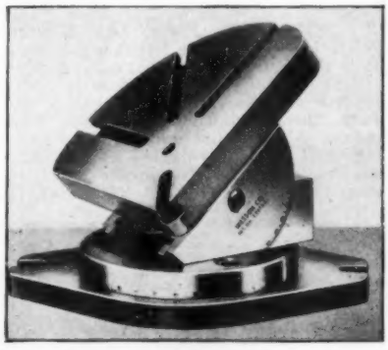
LATHE CHUCKS — *Westcott Chuck Co., 32½ E. Walnut St., Oneida, N. Y.* Light-weight "Oneida" universal lathe chucks for general purpose use are mounted on the spindle by an adapter. Jaws, scrolls and pinions are heat-treated. Sizes run from 4 to 12 in. Vol. 84, p. 944.



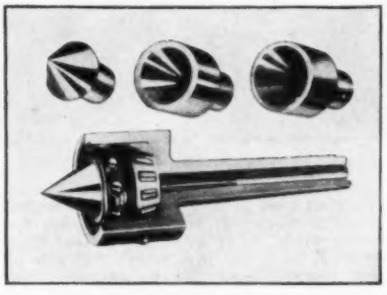
SINE VISE—*Marburg Bros., Inc., 90 West St., New York, N. Y.* "Angle-master" sine vise serves as a rugged tool and a precision gage. Length over-all is 6 in.; length between sine rolls is 5 in. Vol. 84, p. 804.



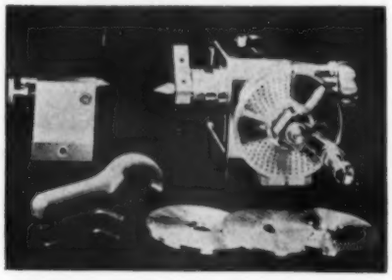
DRILL VISE—*Mohr Lino-Saw Co., 126 N. Union Ave., Chicago, Ill.* A universal drill vise is said to be unusually simple in manipulation. Screws, bolt, and nuts requiring tightening are eliminated. Vise is also practical for use as a standard drilling jig. It is 9 in. long and 5 in. wide over base. Vol. 84, p. 942.



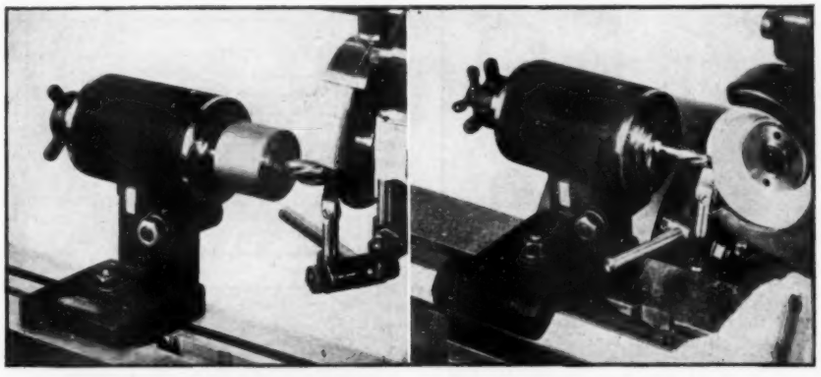
ANGLE PLATE—*Wesson Co., 1050 Mt. Elliott Ave., Detroit, Mich.* This universal angle plate may be adjusted in three planes, each plane completely graduated. Once the work is clamped, it need not be disturbed as the entire device may be moved from one machine to another. Vol. 84, p. 991.



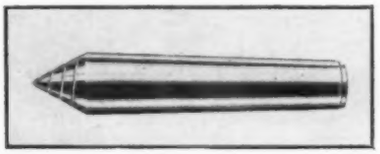
LIVE CENTERS—*Ideal Commutator Dresser Co., 1057 Park Ave., Sycamore, Ill.* Three interchangeable inserts or centerpieces are provided with this live center. These include: a male insert, a plain female insert, and a female insert with three raised lands. Vol. 84, p. 350.



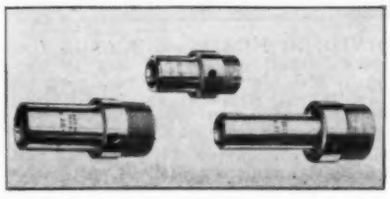
INDEX CENTERS—*Hardinge Bros., Inc., Elmira, N. Y.* Index centers for precision toolroom milling machines incorporate sturdy construction and large collet capacity. Spindle section swings through an arc of 220 deg. and is graduated in degrees for settings from 10 deg. below horizontal to 20 deg. beyond vertical. It swings work having a 7 in. diameter. Vol. 84, p. 944.



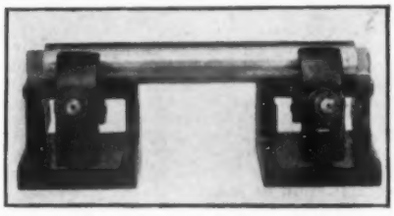
TOOL GRINDING ATTACHMENTS—*Brown & Sharpe Mfg. Co., Providence, R. I.* Nos. 10, left, and 13, right, end mill grinding attachments for B&S No. 10 cutter and tool grinding machine and No. 13 universal end tool grinding machine respectively sharpen peripheral teeth of steep spiral end mills having straight or taper shanks. Vol. 84, p. 593.



GROOVED CENTER—*Chicago Mfg. & Distributing Co., 1928 W. 46th St., Chicago, Ill.* It is claimed that work turned between centers need never be relubricated when the Type CMD helical groove lathe center is used in the tail-stock. It is available in sizes from No. 0 to No. 6. Vol. 84, p. 1101.

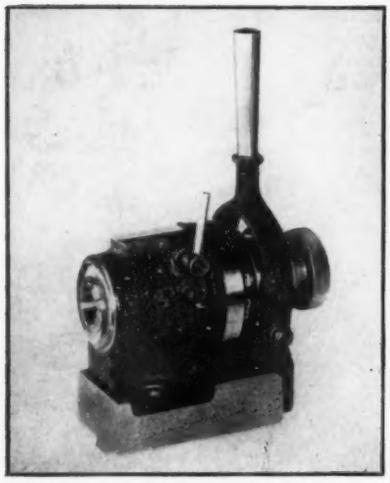


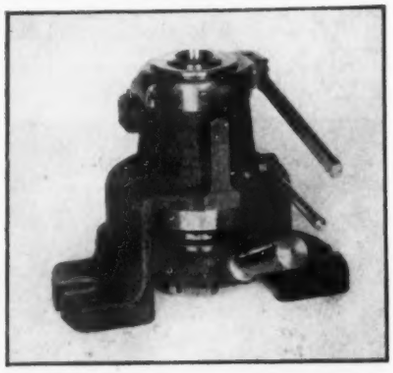
FINGER ADAPTERS — *Brown & Sharpe Mfg. Co., Providence, R. I.* Improved feeding finger adapters for screw machines permit the same finger to be used in machines of several sizes. They also permit smaller fingers for small work in large machines. They are made in nine sizes. Vol. 84, p. 76.

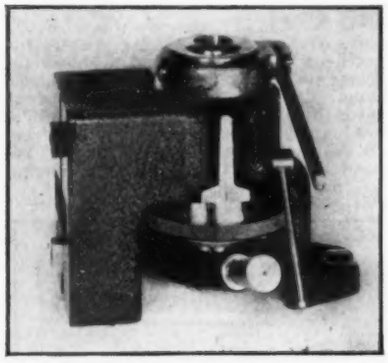


MILLING FIXTURES—*Hart Machine Co., 26 Mather St., Dorchester, Boston, Mass.* Suitable for drill presses, shapers, surface grinders or milling machines, these set-up fixtures have semi-steel bodies and Z-metal clamps. They are available in four sizes for ⅜ to 5 in. round stock. Vol. 84, p. 560.

TOOLS and ACCESSORIES—Work Holders

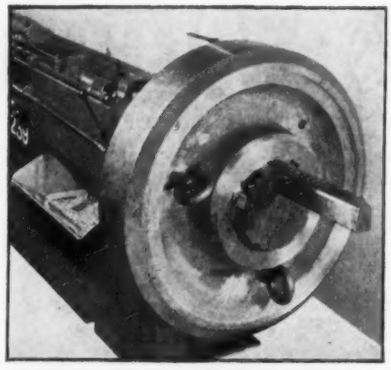




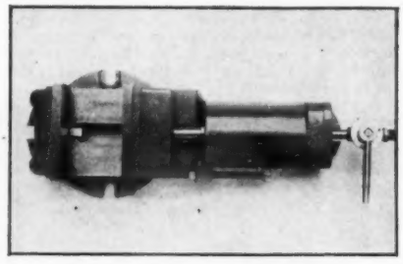


INDEX FIXTURES—*Hardinge Brothers, Inc., Elmira, N.Y.* Three collet index fixtures meet any position requirement or combination of requirements. All fixtures take the same No. 5 C Hardinge 1-in. capacity collet, affording interchangeability. Fixture with a plain handwheel (top), is provided with means for rapid opening and closing of the collet. Index plate has 24 holes providing division of 2, 3, 4, 6, 8, 12 or 24. Vertical fixture (center), also is arranged with a lever collet closer for rapid production work. Its index plate has 24 holes to obtain 2, 3, 4, 6, 8, 12 and 24 divisions. Combination horizontal and vertical fixture (bottom), has features of both horizontal and vertical units. Its index plate is provided with 24 holes with a method to pre-select any combination of holes. Vol. 84, p. 440.

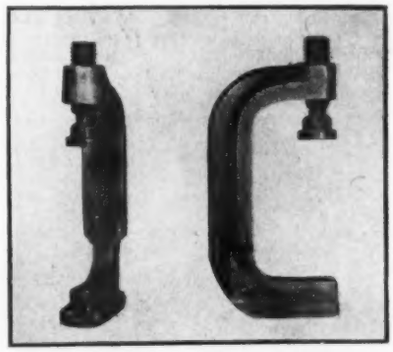
CENTERLESS GRINDER BLADES—*Fansteel Metallurgical Corp., North Chicago, Ill.* "Tantung" centerless grinder rests for any type of machine or grinding operation are faced with tough hard facing alloy, composed of hard particles of tantalum and tungsten carbide. Vol. 84, p. 228.



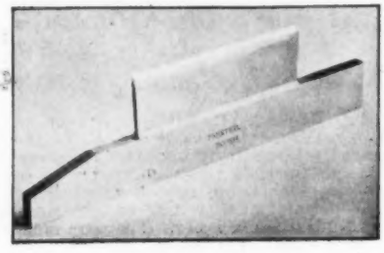
BROACH FIXTURE—*Colonial Broach Co., 147 Jos. Campau, Detroit, Mich.* Production of accurate splines in large wheels and gears in limited quantities is facilitated by this indexing fixture for use on universal horizontal broaching machines. Vol. 84, p. 28.

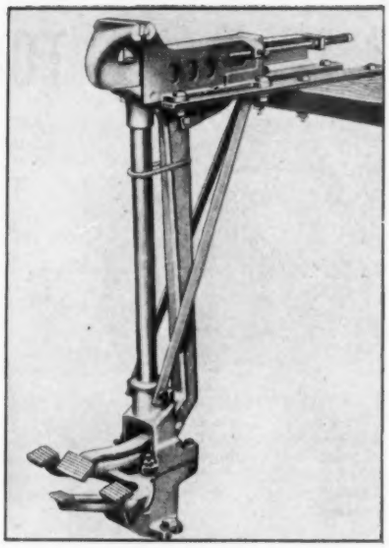


PNEUMATIC VISE—*Larkin Air Vise Co., Portland, Conn.* This pneumatically operated vise is designed for production machine work. It is also adaptable for bench work. It is available in five sizes from 4 to 8 in. jaw width. Depth of jaw ranges from 2¼ to 3½ in., and maximum opening from 3¼ to 5 in. Vol. 84, p. 227.



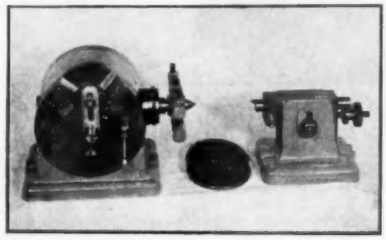
MACHINE CLAMP—*Advance Machine Works, 3727 Weisser Park, Fort Wayne, Ind.* This clamp in sizes from 1 to 12 in. replaces bolts, struts and jacks in setting up jobs on machine tables and lathe face plates. T-shaped base slides into T-slot of any machine table. Vol. 84, p. 444.



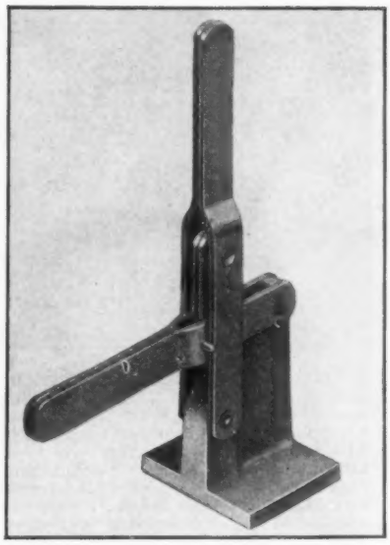


VISE-CLAMP—*Automatic Vise Sales Co., 2845 Sunset Place, Los Angeles, Calif.* Both hands are left free for work with this automatic vise and clamping tool. Free-sliding movable jaw is easily pushed with hand or body against the work, then clamped and released with pedals. All vital parts are made of case-hardened steel. Two types of mounting are available—directly on the bench or away from the bench. Vol. 84, p. 844.

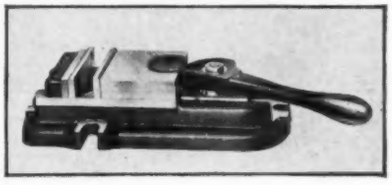
MACHINE VISE—*Engineering Service, Inc., Box 44, Huntington Park, Calif.* Any compound angle can be instantly obtained with the "Strickland" universal ball joint vise. This device provides quick and accurate settings in any horizontal angular position, any vertical angle combined with any horizontal angle, and any compound vertical angle combined with any horizontal angle. Range is 30 deg. through horizontal plane. Vol. 84, p. 777.



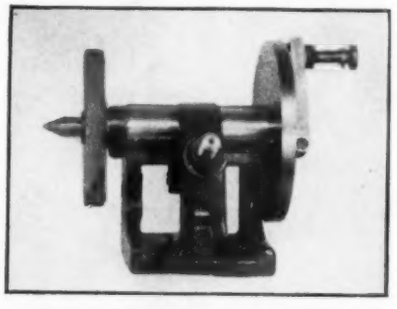
DIVIDING HEADS—*L-W Chuck Co., Toledo, Ohio.* Models AU and BP universal dividing heads will swing 11 in. Supplied in either right- or left-hand styles, the Model BP weighs 125 lb. The 200-lb. Model AU full-universal head can be arranged for spiral cutting and differential indexing. Vol. 84, p. 316.



TOGGLE CLAMPS—*Knu-Vise, Inc., 6430 Cass Ave., Detroit, Mich.* Improved Series KV toggle clamps have toggle bar made in two parts spot-welded in position. There are four clamps in the series, all of which have fixed bases of T-section with ample clamping flange. Vol. 84, p. 72.

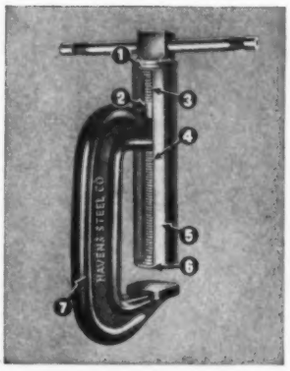


MACHINE VISE—*Brown & Sharpe Mfg. Co., Providence, R.I.* No. IC cam vise is designed for gripping and holding duplicate pieces which do not vary in size more than the clamping movement of the movable jaw. In standard models this movement is approximately 1¾ in. Vol. 84, p. 34.

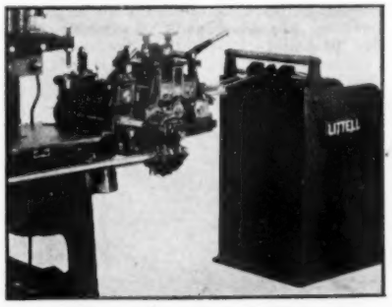


DIVIDING HEAD—*Hart Machine Co., 26 Mather St., Dorchester, Boston, Mass.* Dividing heads of simple construction have been made available for a wide variety of work on drill presses, milling machines, shapers and surface grinders. Heads are available with or without tailstock assembly. Head can be equipped with standard driving faceplate as shown, or with a 4 in. Whiton chuck. Index plate is drilled on one side with 18, 20, 22 and 24 holes, and on other side with 26, 28, 30 and 32 holes. Vol. 84, p. 594.

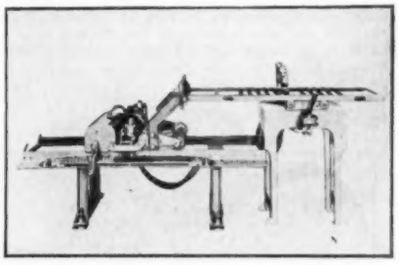
REEL—*Moslo Machinery, Inc., 5005 Euclid Ave., Cleveland, Ohio.* The "Shiftweight" counterbalanced tilting wire reel has reel arms adjustable to the outside diameter of a 42-in. ring. Reel is claimed to be stable in virtually any position. Vol. 84, p. 152.



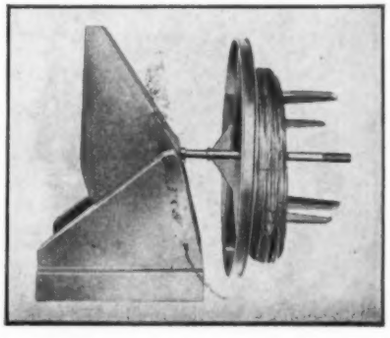
CLAMP—*Scully Steel Products Co., 1319 Wabansia Ave., Chicago, Ill.* "Havens" protected C-clamp has been specially designed for welding shops. Shield protects threads and prevents weld spatter from clogging them. Clamps are made in shallow, medium and deep throat, in various sizes. Vol. 84, p. 805.

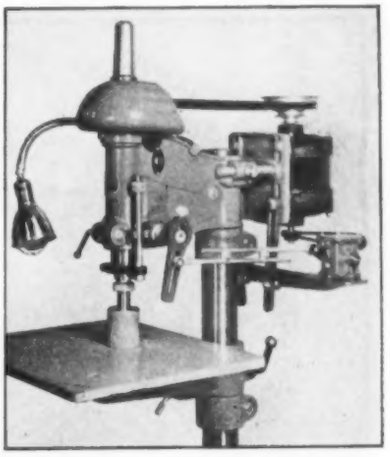


SCRAP CUTTER—*F. J. Littell Machine Co., 4169 Ravenswood Ave., Chicago, Ill.* Punch press scrap can be cut to predetermined lengths and finished products cut to length with this intermittent scrap cutter. It operates at any given number of press strokes. Vol. 84, p. 894.

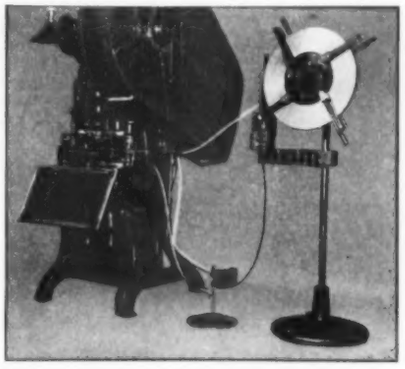


AUTOMATIC FEEDER—*A. R. Pollasky, 3918 N. 23rd St., Milwaukee, Wis.* Featuring a pneumatically operated carriage, this automatic feeder can be used with any size or style of press, mechanical or hydraulic. Blanks are placed in position while press is operating. Vol. 84, p. 265.

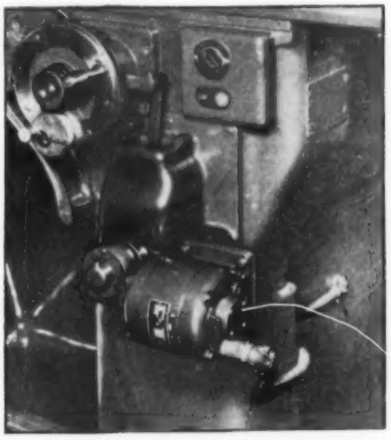




OSCILLATING MECHANISM—*Specialty Machinery Co., 5606 Euclid Ave., Cleveland, Ohio.* "Reciproc" drill press oscillating mechanism provides sanding drum with longitudinal motion. It fits any standard commercial drill press. With a 1,740-r.p.m. motor, it provides 100 complete strokes per min., between ¼ and ⅞ in. Vol. 84, p. 848.

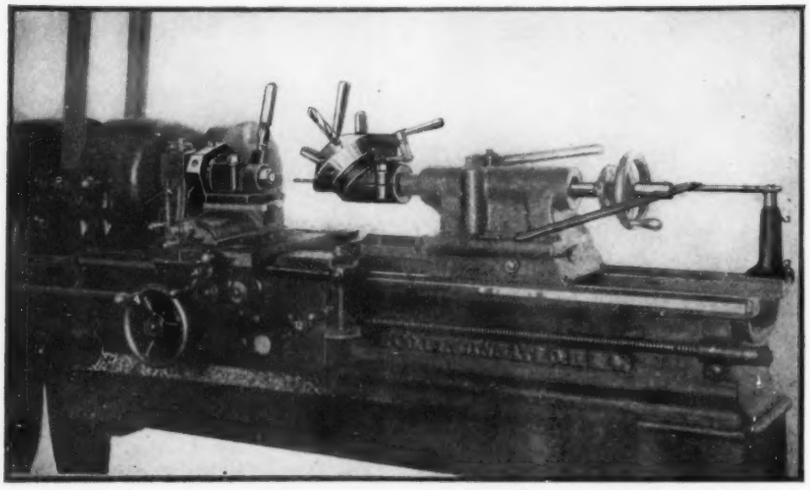


STOCK REEL—*J. A. Honegger, 223 Spruce St., Bloomfield, N.J.* "Simplex" automatic stock reel is actuated electrically by a solenoid. Over-running is prevented by friction washers. Reel will operate satisfactorily on coils up to 200 lb. Vol. 84, p. 67.

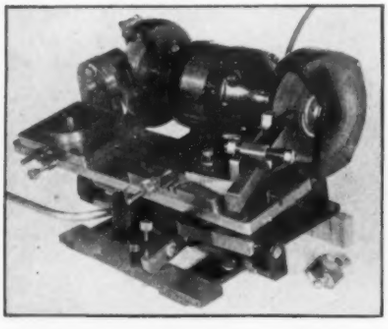


CROSS FEED—*Brown & Sharpe Mfg. Co., Providence, R.I.* Independent automatic cross feed arrangement for No. 5 plain grinding machines furnishes 172 plunge-cut feeds per minute, with feed adjustable by quarter-thousandths from 0.00025 in. to 0.0045 in. per pick. It is applied to the machine at the factory. Vol. 84, p. 593.

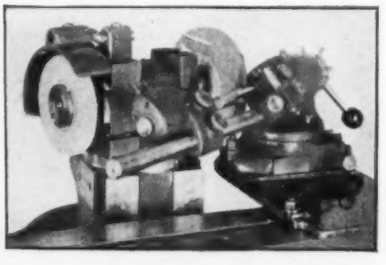
TOOLS and ACCESSORIES—Tool Holders



LATHE ATTACHMENTS—*Jefferson Machine Tool Co., Fourth, Cutter & Sweeney Sts., Cincinnati, Ohio.* Attachments which convert any standard engine lathe into a turret-type machine comprise a tailstock turret, a toolpost turret and an adjustable pull feed, any or all of which may be mounted on any size lathe. Tailstock turret accommodates five tools and is attached easily to tailstock spindle. Toolpost turret provides for four separate tools. Openings measure ⅝ x 1¼ x 1½ in. Adjustable pull feed attaches to tailstock spindle and eliminates turning of spindle feed wheel. It can be used on any lathe having a swing of 18 in. or less. Vol. 84, p. 438.

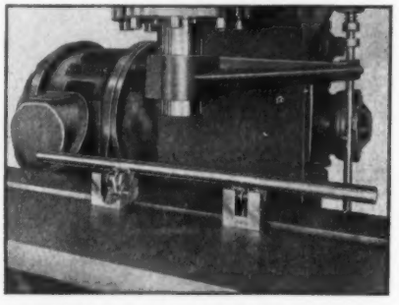


TOOL GRINDING FIXTURE—*Noyes Tool Sales, 601 Laurel Ave., Bridgeport, Conn.* This carbide tool grinding fixture reduces operations to a minimum and covers practically all standard shapes and angles of carbide-tipped tools. Principle consists of two plates sliding at right angles. Vol. 84, p. 843.

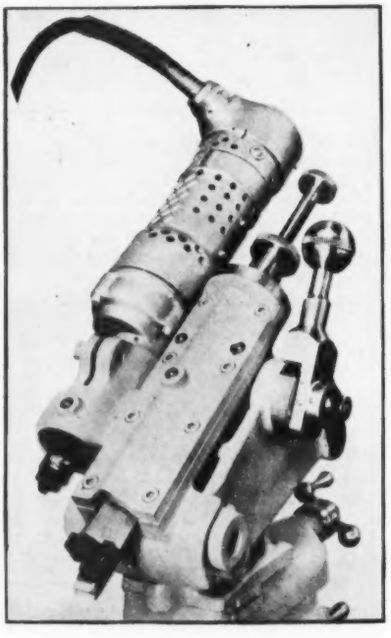


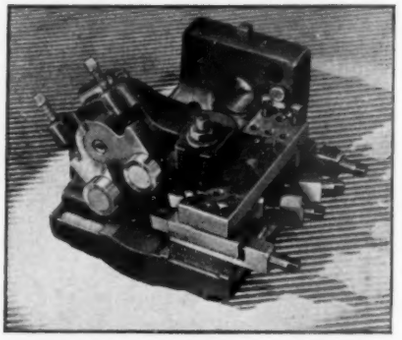
TAP GRINDING ATTACHMENT—*Covel Mfg. Co., Benton Harbor, Mich.* No. 2 tap grinding attachment is easily mounted on any grinding machine having a wheel of 1¼-in. face or less, and longitudinal and transverse adjustment similar to a universal cutter and tool grinder, with a flat table 4½ to 6½ in. wide. Small taps are held in a three-jaw chuck, while larger taps are held on centers. Vol. 84, p. 684.

SUPERFINISHING ATTACHMENT—*Foster Machine Co., Elkhart, Ind.* Size O light duty superfinishing attachment mounts on the lathe compound or cross slide for superfinishing fractional-inch diameters. Oscillation is imparted by small gearmotor. Vol. 84, p. 738.



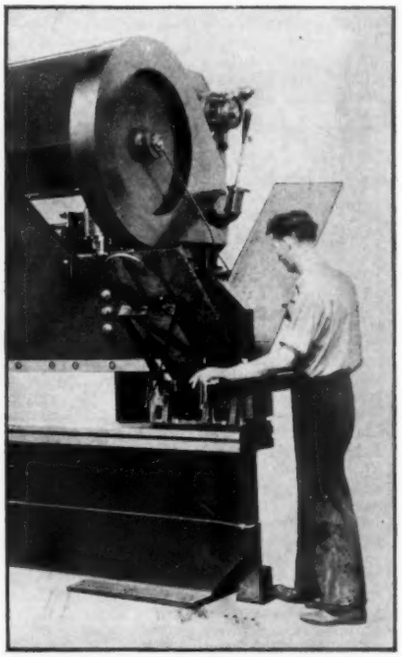
STRAIGHTENING BLOCKS—*Greenerd Arbor Press Co., P.O. Box 415, Nashua, N.H.* Combination test rolls and straightening blocks are designed to speed up straightening of round shafts either turned or ground. Blocks are furnished for straightening shafts of ½–1, 1–2, and 2–3 in. in diameter. Vol. 84, p. 182.



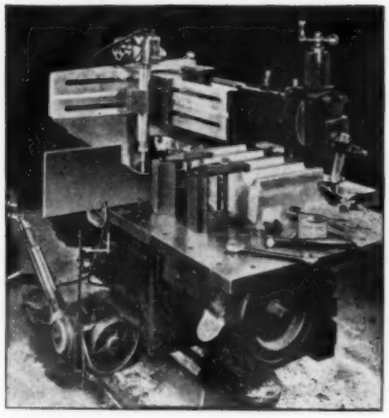


MULTIPLE CUTTER TURNER—*Gisholt Machine Co., 1201 E. Washington Ave., Madison, Wis.* An improved multiple cutter turner for turret lathes will make several reducing cuts simultaneously on bar stock. It takes heavy high-speed cuts and maintains accurate dimensions and fine finish. Set-ups are facilitated by micrometer adjustment screws. Turner is available for diameters as small as ¾ in. and as large as 4¾ in. Vol. 84, p. 400.

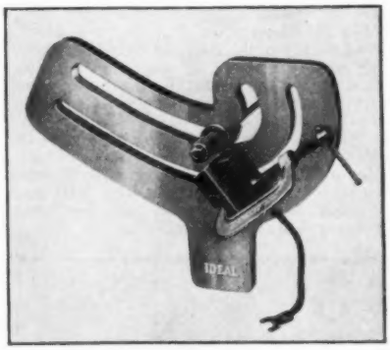
TURRET TOOLHOLDER — *Presto Tool Mfg. Co., 518 Newport Ave. N., Detroit, Mich.* The "Presto" turret-type toolholder takes four ⅜-in. toolbits which can be set individually for the correct height. Vol. 84, p. 149.



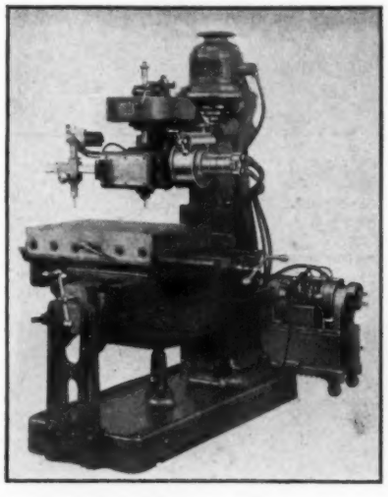
BRAKE FIXTURE—*Cyril Bath & Co., E. 70th St. & Machinery Ave., Cleveland, Ohio.* Reverse bends, often caused by whip in sheet due to difficulty of supporting metal during press action, are eliminated by special fixtures on "Sturdybender" press brake. Fixture supports metal during bending. Vol. 84, p. 262.



DUPLICATOR—*Detroit Universal Duplicator Co., 249 St. Aubin St., Detroit, Mich.* Automatic form cutting with a shaper with form duplicating control utilizing a simple die duplicator permits saving of cost and time. Vol. 84, p. 638.



BRUSH CONCAVER—*Ideal Commutator Dresser Co., 1057 Park Ave., Sycamore, Ill.* With this carbon brush concaver old brush is used as a templet to locate arc segment on cutting guide slot. Any electric drill or electrical shaft drive operates cutter. Vol. 84, p. 995.



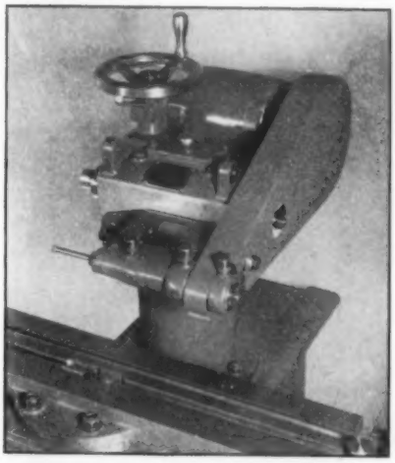
UNIVERSAL DUPLICATOR—*Detroit Universal Duplicator Co., 249 St. Aubin St., Detroit, Mich.* Greater accuracy and faster production in duplicating dies, molds, and similar parts, are claimed for this improved duplicating control and drive mechanism. Sensitivity of control is provided through an auxiliary drive and an improved type duplicator, including a "superimposed" impulse mechanism. Feed control gives accuracy of 0.0015 in. Vol. 84, p. 266.

ELECTRIC GRINDER—*Stanley Electric Tool Div., Stanley Works, New Britain, Conn.* No. 153 grinder, for both hand and lathe grinding, is driven by a ⅜-hp. motor turning the spindle at 18,000 r.p.m. through direct drive. Mounted on ball bearings, it takes wheels up to 1½ in. in diameter. Extended shaft gives a reach of 5 in. Vol. 84, p. 806.

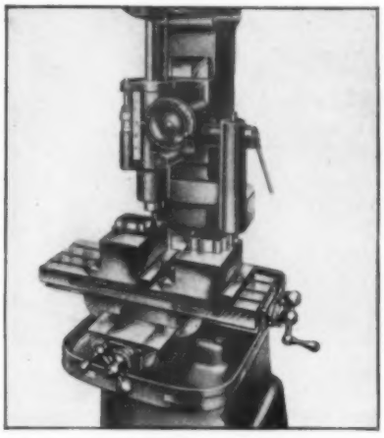
CROSS-SLIDE STOP—*Portman Machine Co., 2236A Bathgate Ave., New York, N.Y.* This multiple-diameter cross-slide lathe stop can be fitted to the wings of any lathe carriage. It consists of an indexing head and four-way cross-slide and rear bearing support. Vol. 84, p. 30.

GRINDER HEADSTOCK—*Brown & Sharpe Mfg. Co., Providence, R.I.* A revolving-spindle headstock for Nos. 20, 22, and 23, plain grinders is available. It consists of a spindle mounted on sealed ball bearings carried in a casting clamped on the table ways at the right of the headstock. It is fitted to the machine at the factory. Vol. 84, p. 221.

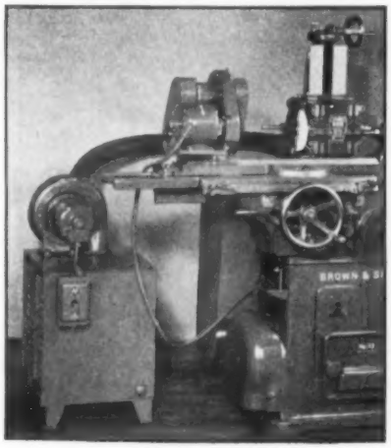
GRINDER EXHAUST—*Brown & Sharpe Mfg. Co., Providence, R. I.* Motor-driven exhaust attachment designed especially for No. 13 universal and tool grinding machine removes grit and dust-laden air. Capacity with ¼-hp. motor is 300 cu.ft. per min. Vol. 84, p. 393.



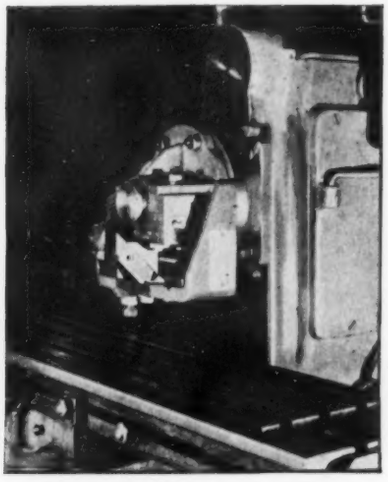
INTERNAL ATTACHMENT—*Brown & Sharpe Mfg. Co., Providence, R.I.* For use with the revolving spindle headstock, this internal grinding attachment permits precision grinding of holes up to 2½ in. long and ½ in. minimum diameter in work of 6¾ in. maximum swing on the No. 10 cutter and tool grinder. Spindle runs at 22,500 r.p.m. and takes wheels ½ in. in diameter, ¼ in. thick, with a $\frac{3}{32}$ in. hole. Vol. 84, p. 394.



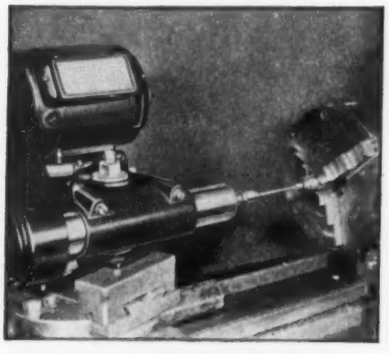
PROFILING ATTACHMENT—*Machinery Mfg. Co., P.O. Box 155, Vernon Branch, Los Angeles, Calif.* A profiling attachment has been developed for use on the Vernon combination vertical mill and jig borer. Its sliding head is so constructed that the attachment easily can be engaged and disengaged. Vol. 84, p. 554.



TOOLS and ACCESSORIES—Punches, Dies

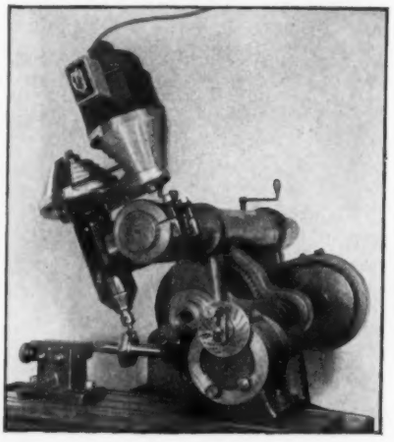


CHERRYING ATTACHMENT—*Aber Engineering Works, 1613 Flett Ave., Racine, Wis.* This cherrying attachment fits both vertical and horizontal milling machines, making it possible to cut sharp corners, channels, undercuts, hollows and concave areas. A standard cutter is used for roughing; then to remove the final 0.015 to 0.020 in., a special cherrying cutter is used. Vol. 84, p. 552.

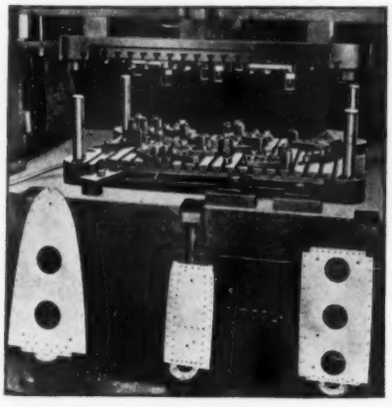


GRINDING WHEEL SUPPORT—*Dumore Co., Racine, Wis.* A mounted wheel shank support for internal grinding with small diameter wheels has been developed for grinding small holes to considerable depths. A special 3-in. wheel shank is necessary. Vol. 84, p. 148.

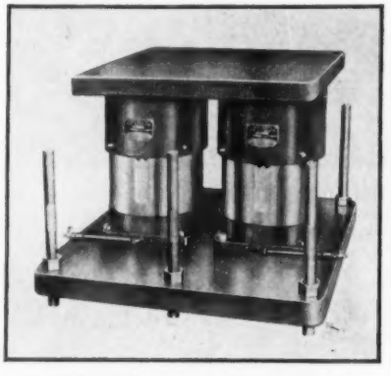
GUIDE POST COVERS—*Danly Machine Specialties, Inc., 2104 S. 52nd Ave., Chicago, Ill.* Safety guide post covers protect against punch press operators losing fingers, hands or arms by getting them caught in gaps when bushings leave guide posts. Oilers can be incorporated in the top unit of all three types available. Vol. 84, p. 107.



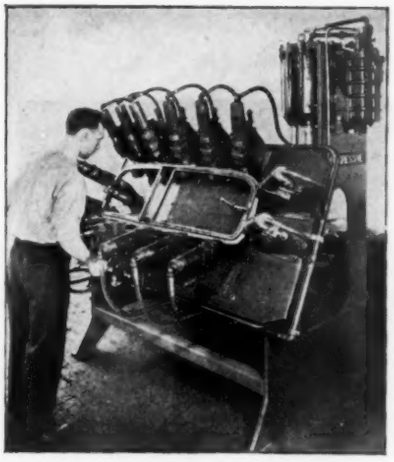
MILLING ATTACHMENT—*Rusnok Tool Works, 224 N. Loomis St., Chicago, Ill.* This improved high-speed motor-driven milling attachment provides a universal mounting graduated through 360 deg. Can be equipped with a low-speed motor, reducing standard speed range one-third and permitting milling of hard steels. Six spindle speeds are provided. Vol. 84, p. 66.



DIE SETS—*S. B. Whistler & Sons, Inc., Buffalo, N.Y.* Made in various sizes, these universal adjustable die sets permit much closer grouping of punches and strippers than possible by other methods. They may be rearranged as often as desired. Various sizes of punches for perforating and notching can be arranged in different positions. They are available in stock sizes from 0 to 1½ in. Vol. 84, p. 846.

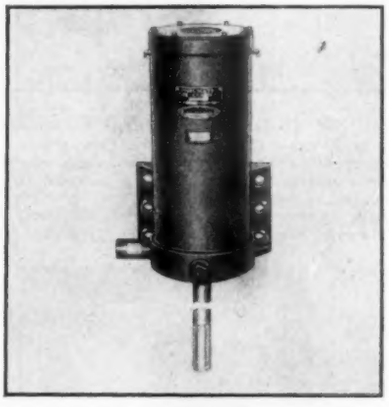


DIE CUSHION—*Dayton Rogers Mfg. Co., 2830 S. 13th Ave., Minneapolis, Minn.* Model H pneumatic die cushion is made in four sizes. It may be used singly or in multiples of two, four and six, mounting plates being made to fit press requirements. Vol. 84, p. 266.

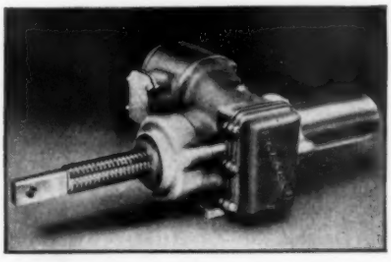


PUNCH UNITS—*Progressive Welder Co., 701 Piquette Ave., Detroit, Mich.* Hydraulic punching units employing a balanced spring principle can be mounted singly or in groups as required. Punching fixture shown comprises 12 to 16 units (according to the number of holes), a nesting form for the work, and an air-hydraulic booster. Vol. 84, p. 27.

ROUND-HOLE DIES—*Carboloy Co., 11149 E. Eight Mile Rd., Detroit, Mich.* Availability of standard Carboloy round hole dies for drawing sizes of bar and tubing up to 3½ in. in diameter, and improvements in construction in the larger series—R7 to R16—of standard drawing dies, have been announced. In addition, "cored" dies previously available only in R1 to R6 series, are now available in series R7 through R10, for drawing fractional sizes of bar and tubing. Vol. 84, p. 804.

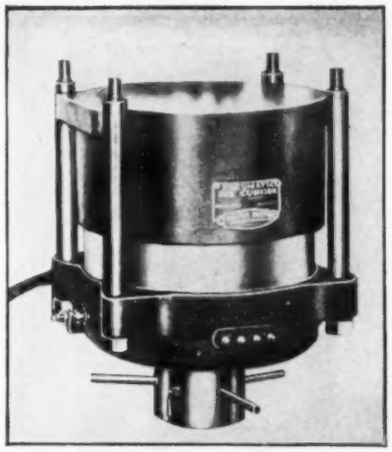


PNEUMATIC CYLINDER—*Dayton Rogers Mfg. Co., 2830 S. 13th Ave., Minneapolis, Minn.* Model G pneumatic counter-balanced cylinders for ram slides on large presses having long strokes offset "over-riding" or falling of ram. They are available in 6 to 14 in. diameters with 10 to 30 in. strokes. Vol. 84, p. 70.

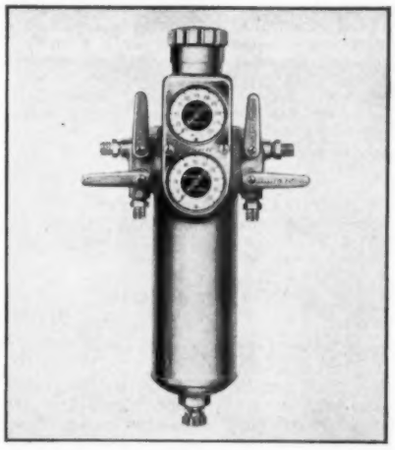


PUSH-PULL MOTOR—*Electromarine Corp., Westport, Conn.* "Motoram" mechanism produces a straight line power stroke in both directions. Shaft has minimum travel of ½ in. and maximum travel of 72 in. Four sizes are available with capacities of 100 to 3,000 lb. Vol. 84, p. 114.

Lubricators, Filters—TOOLS and ACCESSORIES



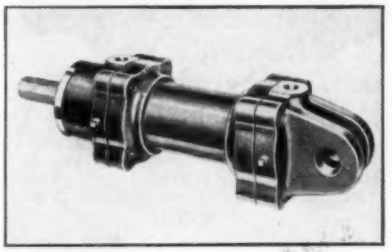
DIE CUSHION—*Dayton Rogers Mfg. Co., 2830 S. 13th Ave., Minneapolis, Minn.* Model D improved universal pneumatic die cushion is made in seven sizes from 6 to 14 in., having capacities for deep drawing work from 2 to 6 in. for use with or without tank reservoirs. Vol. 84, p. 1040.



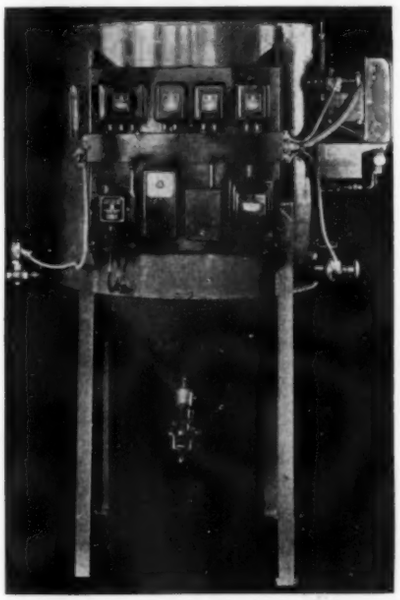
AIR CLEANER-REGULATOR—*De-Vilbiss Co., Toledo, Ohio.* Type HLC improved air transformer feeds clean, moisture-free air at regulated pressure to paint spray guns. It will handle 50 cu.ft. per min. Vol. 84, p. 230.

COOLANT PUMP—*Warren Steam Pump Co., Warren, Mass.* "Coolflo" coolant pump, designed especially for machine tool application, will circulate coolant containing dirt, chips and abrasives with minimum wear and without clogging. Vol. 84, p. 894.

REGULATOR VALVE — *Dayton Rogers Mfg. Co., 2830 S. 13th Ave., Minneapolis, Minn.* A combination pressure gage and self-contained reducing regulator valve receives a varying or high pressure at the inlet side and automatically delivers a constant pressure at the outlet. It is suitable for all types of air pressure control. Vol. 84, p. 350.

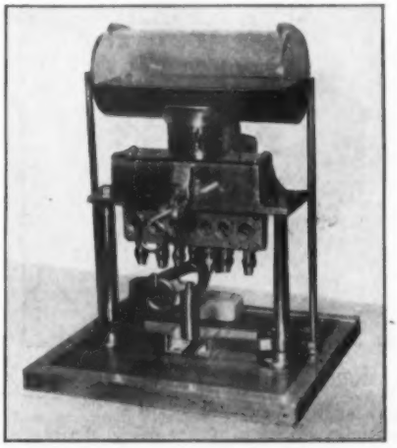


HYDRAULIC CYLINDERS—*Hannifin Mfg. Co., 621 S. Kolmar Ave., Chicago, Ill.* Two standard swivel-mounting high-pressure hydraulic cylinders have been announced. Model BN 18 a high-pressure unit with a small diameter piston rod. Model B2N has a two-to-one differential piston rod. Vol. 84, p. 402.

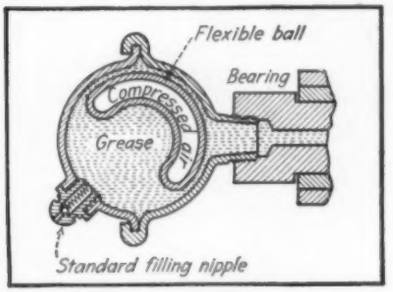


COOLANT PURIFIER—*Leon J. Barrett Co., Worcester, Mass.* Combination sterilizer and sedimentator purifies and removes sediment from coolant in the same operation. It is placed in the oil line between the extractor and the supply tank. Vol. 84, p. 1036.

OIL CONDITIONER—*Olixir Products Co., 887 Niagara St., Buffalo, N.Y.* Model K-1 "Kralinator" oil conditioner features a replaceable, impregnated element for separation of foreign matter from lubricating oil. It will remove water, harmful acids, carbon sludge and varnish-forming substances. Vol. 84, p. 270.

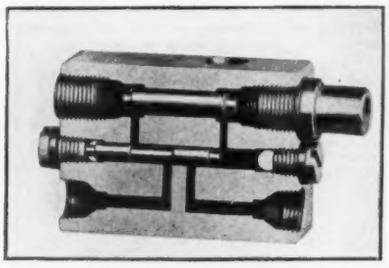


LUBRICATOR—*Bromley & Son, 232 Chestnut St., Kearny, N.J.* "Mykrofeed" lubricator for machine tools and other industrial equipment feeds oil to bearings by gravity. Variable-feed wick units and sight feeds feature this lubricator. Oils up to 2,000 sec. Saybolt viscosity can be handled. Vol. 84, p. 70.

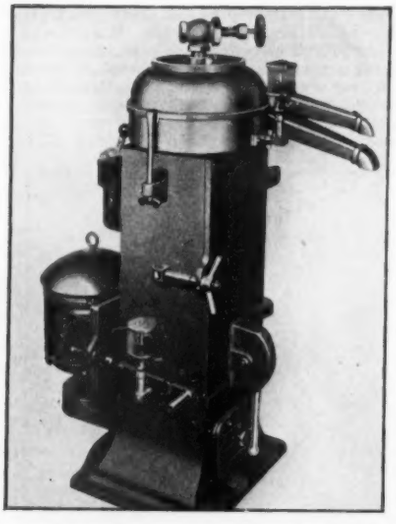


AUTOMATIC LUBRICATOR—*Simplex Mfg. Co., 1504 Broadway, Detroit, Mich.* Continuous feeding of lubricant to its bearing, regardless of viscosity or temperature changes, is claimed for this automatic lubricator. It consists of a spherical steel shell with a hollow Neoprene ball inside. Filling pressure collapses ball and compresses air within, thus feeding lubricant. Vol. 84, p. 311.

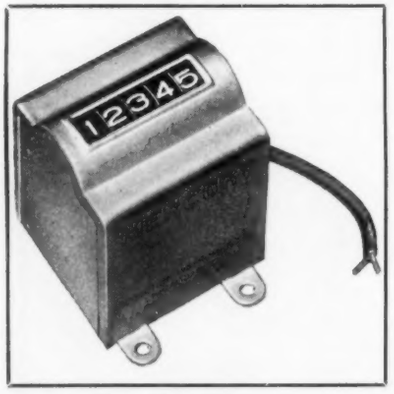
TOOLS and ACCESSORIES—Lubricators, Timers



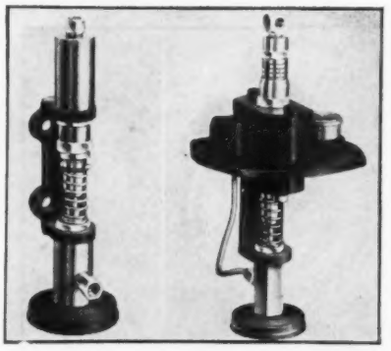
LUBRICATION SYSTEM — *Farval Corp., Cleveland, Ohio.* "Dualine Jr." centralized lubrication system operates on the same piston displacement principle of measurement as employed in larger systems on heavier machines. Size has been greatly reduced to provide correct application to small machines. In keeping with smaller pumps and measuring valves, a corresponding line of fittings, hose, couplings and other accessories has been produced. Vol. 84, p. 780.



CENTRIFUGE—*National Acme Co., 170 E. 131st St., Cleveland, Ohio.* No. C-1 positive universal centrifuge is especially suited to shops using considerable quantities of cutting, lubricating, hydraulic or soluble oils. It saves oil, protects bearings and increases tool life. Vol. 84, p. 1100.



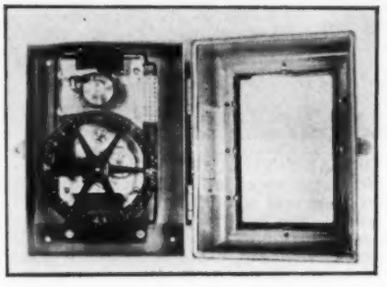
ELECTRIC COUNTER — *Production Instrument Co., 702–06 W. Jackson Blvd., Chicago, Ill.* "Mercury" magnetic counter consumes only 2 watts, insuring long contact life and making the instrument particularly suited for electric eye operation. Device will operate at 600 counts per minute. It is available for 60-cycle a.c. voltages up to 230, and for d.c. voltages up to 115. Vol. 84, p. 790.



LUBRICATOR — *Bijur Lubricating Corp., 22–08 Forty-Third Ave., Long Island City, N.Y.* These automatic lubricators have no mechanical drive connection between machine and lubricator pump. Small tube connects machine's hydraulic system and pump used for feeding oil to various bearings. Vol. 84, p. 110.

AIR LUBRICATOR—*Ingersoll-Rand Co., 11 Broadway, New York, N. Y.* Type F "Oil-Ir" air line lubricator is suitable for many types of air-operated tools. Adjustment of oil feed can be made without taking pressure off chamber or interrupting work. Vol. 84, p. 36.

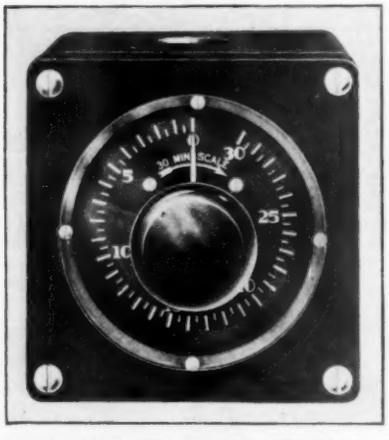
INTERVAL TIMER — *Photoswitch, Inc., 21 Chestnut St., Cambridge, Mass.* Type T 15 electronic timer is said to be extremely accurate over ranges from 1/20th of a second to two minutes. Control is accomplished through a specially designed snap-action relay of 1,000 watts capacity. Equipment permits both momentary pushbutton and sustaining contact control. Vol. 84, p. 784.



COOLANT PUMPS—*Ruthman Machinery Co., Front & Pike Sts., Cincinnati, Ohio.* Model P-3 "Baby" gusher coolant pumps are particularly adapted for small lathes, grinders, honing and lapping machines, automatic lathes, and larger machines requiring only a moderate volume of coolant. Features are a built-in motor, rugged vertical shaft suspended on precision ball bearings, double suction intake which provides a balanced impeller, and easy installation on both old and new machines. Vol. 84, p. 442.

"LUBRIGUARDS" — *Alemite Div., Stewart-Warner Corp., 1826 Diversey Parkway, Chicago, Ill.* "Lubriguard" fittings (not shown) signal when a bearing is sufficiently lubricated. They are installed directly in bearings. Vol. 84, p. 270.

PHOTOELECTRIC CONTROL — *United Cinephone Corp., 43–37 33rd St., Long Island City, N. Y.* No. 60 photo-electric controls (not shown) are housed in compact inclosures having ½-in. knockouts in bottom for power connections and fourth knockout on top for wiring external photo-cell. Telephone-type relays ordinarily are provided, permitting maximum non-inductive load of 3 amp. a.c., at operating speeds up to ten per second. Vol. 84, p. 522.

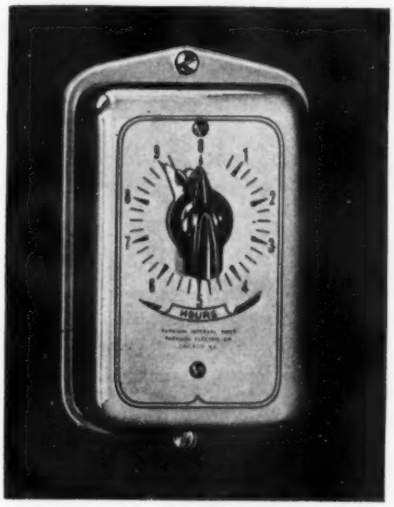


INTERVAL TIMER—*R. W. Cramer Co., Centerbrook, Conn.* Model D2 interval timer controls equipment which may be subjected to excessive moisture and dust conditions. Twelve different scales are available. Vol. 84, p. 1047.

PROGRAM SWITCH—*R. W. Cramer Co., Centerbrook, Conn.* This synchronous motor-driven automatic program switch can be preset to close an electrical circuit for from 5 to 25 seconds, precisely at any 5-minute intervals of the 24 hours. Device will handle up to 30 operations per day. Vol. 84, p. 1106.

Timers, Grinding Wheels—TOOLS and ACCESSORIES

PROGRAM CLOCKS—*Zenith Electric Co., 845 S. Wabash Ave., Chicago, Ill.* Signals can be operated in any five minute period with the Type P 512 and at any one minute period with the Type PD 124 synchronous program clocks. Vol. 84, p. 1050.



TIMER—*Paragon Electric Co., 37 W. Van Buren St., Chicago, Ill.* 128 models of interval timers and time delay relays are designed for all type of electrical equipment which must be accurately timed in split seconds, minutes or hours. They are equipped with silver contact micro switches. Vol. 84. p. 898.

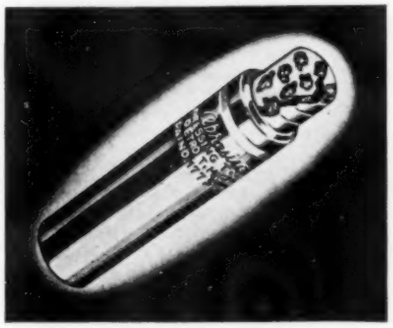
TIMERS—*R. W. Cramer Co., Centerbrook, Conn.* Improved micrometer adjusting knob and indicator are incorporated in these automatic reset timers and time delay relays. A knurled knob drives a worm gear which slowly moves a pointer around the dial. Instruments can be reset to virtually identical values. Vol. 84, p. 783.

ELECTRIC STOPWATCH—*Precision Scientific Co., 1750 Springfield Ave., Chicago, Ill.* "Time-It" electric stopwatch has easily read split-second indicating counter which totalizes to 10,000 sec. before repeating. Readings are direct to 0.10 sec. Counter can be reset to zero from any reading or successive readings totalled. It plugs into any 110 volt a.c. circuit. Vol. 84, p. 446.

AUTOMATIC TIMER—*R. W. Cramer Co., Centerbrook, Conn.* Type RS automatic reset timers close or open a circuit, after an adjustable preset time, and instantly return to starting position ready to repeat cycle. Vol. 84, p. 314.

PRODUCTION COUNTER—*Production Instrument Co., 702–06 W. Jackson Blvd., Chicago, Ill.* "Silver King" mechanical counter (not shown) has Bakelite number wheels, reducing by 85 per cent the weight that must be started and stopped with every count. Unbreakable windows of reinforced plastic are used. Vol. 84, p. 558.

ABRASIVE DISK—*Abrasive Products, Inc., South Braintree, Mass.* Unusual heat resistance claimed for the "Silver-Streak Insulated" grinding disk (not shown) is said to result from a specially developed binder, which holds grits in cutting position at temperatures up to 1,800 F. Vol. 84, p. 270.



DIAMOND TOOLS—*Abrasive Dressing Tool Co., 1550 Broadway, Detroit, Mich.* "Red Band" diamond tools employ "Oxide-Free" process to anchor diamonds. Vol. 84, p. 648.

TIMER—*Paragon Electric Co., 37 W. Van Buren St., Chicago, Ill.* "Paragon" automatic reset timers and time delay relays close and reopen a circuit, open and reclose a circuit, make momentary contact, repeat a preset schedule of momentary contacts, reset instantaneously after power failure. Vol. 84, p. 268.

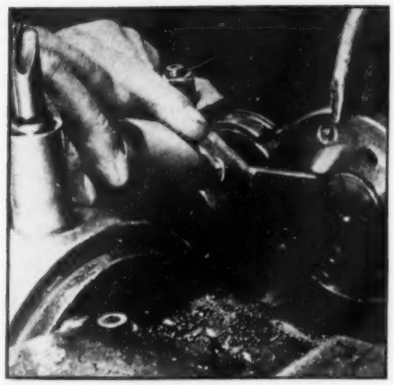
GRINDING WHEELS—*Atlantic Abrasive Corp., 516 Pearl St., South Braintree, Mass.* Two types of wheels (not shown) have been developed for efficient use on the more difficult metals. Type L. A. is a hard-tempered wheel for aluminum, copper, zinc, brass, iron, steel and Stellite. Type S. C. is a soft-tempered wheel, made in all grain sizes from coarse to fine, and designed for fast, clean grinding of Stellite, Carboloy and alloyed steels. Both are made with a new synthetic bond. Vol. 84, p. 554.

GRINDING WHEELS—*Atlantic Abrasive Corp., 516 Pearl St., South Braintree, Mass.* Two wheels for difficult precision grinding (not shown) involved in finishing high-speed steels, etc., are available. Type LB is made for fast, clean cutting on tools or dies. Synthetic bond is used. Type SB is a medium-tempered wheel for grinding fine tools made of high-speed steel, Stellite, Carboloy and other carbides. Vol. 84, p. 403.

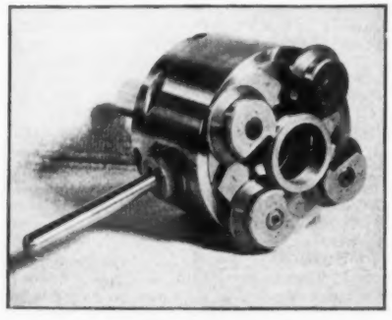
GRINDING WHEEL—*Atlantic Abrasive Corp., 516 Pearl St., South Braintree, Mass.* Improved Type AK grinding wheel (not shown) especially designed for weld grinding and snagging uses synthetic bonding material for high speed and pressure. Vol. 84, p. 485.

WIRE BRUSHES—*Van Dorn Electric Tool Co., Towson, Md.* "Whirlwind" wire wheel brushes are available in sizes, thickness and gages to suit practically any brushing application. One-section, two-section and three-section brushes are made. Sizes from 4 to 12 in. permit use on all types of machines. Vol. 84, p. 441.

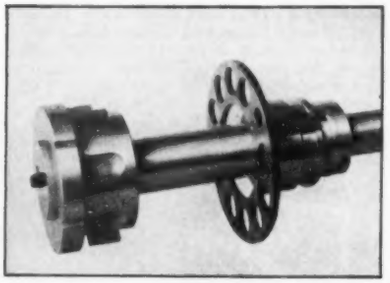
TOOLS and ACCESSORIES—Cutters



DIAMOND-LAP HONES—*H & H Research Co., 1925 W. Bucna Vista, Detroit, Mich.* Diamond-lap hones in any grit from rough-cut to 500 are for use in "multi-purpose" reciprocating electric tools. These hones are set $\frac{1}{32}$ or $\frac{1}{16}$ in. thick and 1 in. long on the body face. Vol. 84, p. 396.

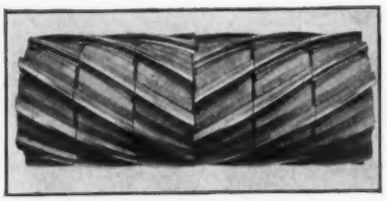


HOLLOW MILLING HEADS—*National Acme Co., 170 E. 131st St., Cleveland, Ohio.* Complete line of end turning, end forming, combination turning and threading cutters of the circular type is available for standard circular chaser die heads. One head can be used both for threading and for hollow milling. Tools for reaming, facing, beveling or chamfering also may be inserted in heads. Heads are supplied for both revolving and non-revolving spindle machines in sizes from ¼ to 13⅜ in. Vol. 84, p. 398.

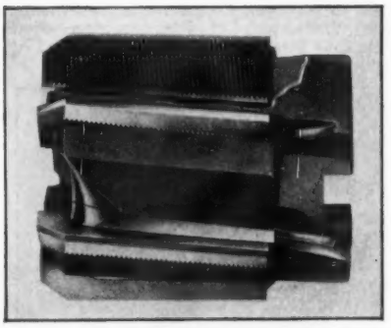


DEEP-HOLE TAP—*Geometric Tool Co., New Haven, Conn.* Developed especially for deep holes in large castings, this S-in. Class S collapsing tap will cut diameters from 8½ to 10 in., 8 threads per in. This is a lengthened tap equipped with roller pilots. Vol. 84, p. 266.

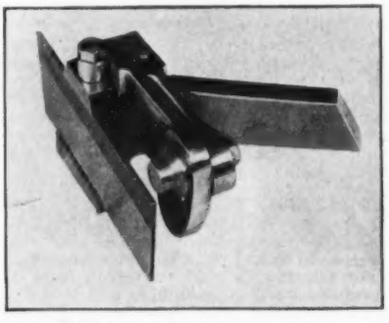
TOOL STEEL—*Jessop Steel Co., 595 Green St., Washington, Pa.* "773" medium-carbon manganese-molybdenum steel (not shown) is said to possess unusual toughness, making it suited for tools, dies, punches, cutting tools, chisels, etc., and for applications where exceptional toughness in thin sections is required. Vol. 84, p. 1110.



SLABBING CUTTER — *Goddard & Goddard Co., 12280 Burt Rd., Detroit, Mich.* A double-life blade has been incorporated in this sectional slabbing cutter. Cutter body is made from alloy steel heat-treated for toughness and strength. Holes are chrome plated to resist wear. Cutters are available in 8½ to 11 in. diameters with 10 to 14 blades per section. Maximum hole size ranges from 3 in. for an 8½ in. cutter to 5 in. for an 11 in. Vol. 84, p. 30.



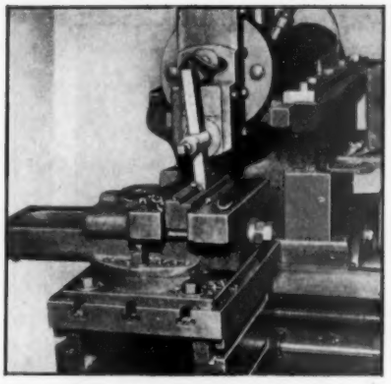
HOGGING REAMER — *Goddard & Goddard Co., 12280 Burt Rd., Detroit, Mich.* Available in both shell and shank types, heavy-duty hogging reamers feature a large chip space and heavy blades tapered on the bottom. Shank type reamers range from 1.500 to 3.1875 in. in diameter, with over-all length of 12 to 16 in. Shell type reamers are made in 3.250 to 6.000 in. diameters with lengths of 4 to 5 in. Vol. 84, p. 31.



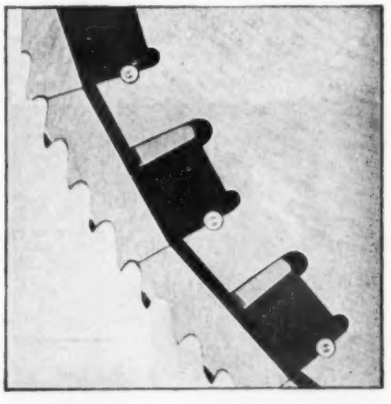
CUTTING-OFF TOOL—*Anthony Cutting Off Tools, P.O. Box 1684, San Antonio, Texas.* Chattering is claimed to be eliminated in this line of cutting-off tools. Stock up to 10 in. in diameter can be easily and safely cut off. Four sizes are stocked, for diameters of 4, 6, 8 and 10 in. Vol. 84, p. 1037.

BANDSAW STOCK—*W. O. Barnes Co., Detroit, Mich.* Lengths of metal-cutting bandsaw stock (not shown) up to 100 ft. in widths of ½ in. and less are packaged in a flat carton, with one end of the coil readily accessible. Carton allows saw to coil loosely, eliminating blade checking. Vol. 84, p. 231.

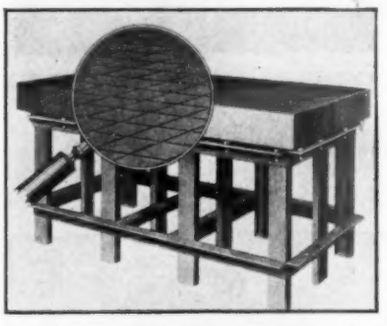
FILE CHAIN—*Grob Bros., Grafton, Wis.* Improved files and file-chains for continuous-motion filing machines provide alignment through an overlapping feature. As files pass and follow each other, there is a smooth clean-cutting action which eliminates chipping. Vol. 84, p. 350.



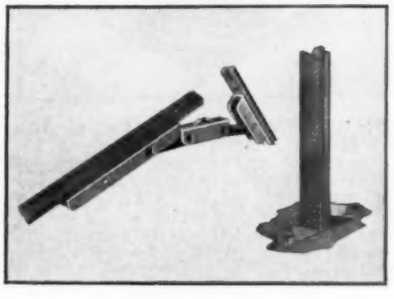
SHAPER TOOLS—*McKenna Metals Co., 103 Lloyd Ave., Latrobe, Pa.* Standard steel-cutting-tools tipped with Grade KS "Kennametal" for use on shapers and planers machine steel of hardnesses up to 550 Brinell. Tool angles employed make it unnecessary to lift tool on return stroke. Vol. 84, p. 74.



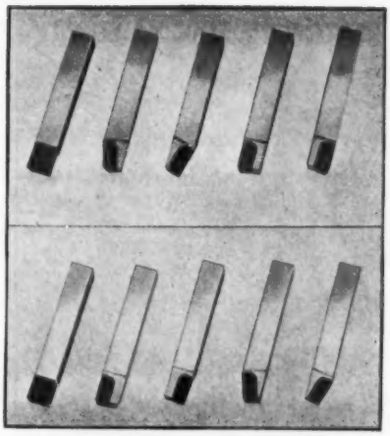
SEGMENT SAWS—*Pittsburgh Saw & Tool Co., 75 Sycamore St., Etna P.O., Pittsburgh, Pa.* These fine-pitch segment saws feature segments held in place with wedges. Saws are available in 14 to 60 in. diameters with kerfs of ¼ to ½ in. Vol. 84, p. 228.



LAPPING PLATE — *Challenge Machinery Co., Grand Haven, Mich.* This semi-steel lapping plate has $\frac{1}{16}$-in. grooves, spaced ½ in. apart, running the full length and width of the surface. A specially designed all-steel arc-welded stand is available. Plates are built in standard sizes ranging from 8x8 to 52x144 in. Vol. 84, p. 1100.



Tool Materials—TOOLS and ACCESSORIES



CARBIDE TOOLS — *Carboloy Co., 11149 E. Eight Mile Rd., Detroit, Mich.* Standard cemented-carbide tipped cutting tools cover, in five standard styles and three grades, the majority of all turning, boring and facing applications. Vol. 84, p. 900.

HACKSAW BLADE—*Clemson Bros., Inc., Middletown, N.Y.* "Star" tungsten-alloy hacksaw blade (not shown) with cutting qualities of all-hard tungsten blades is claimed to be so flexible that it cannot be broken in a frame. Vol. 84, p. 1040.

CARBIDE TOOLS—*Wesson Co., 1050 Mt. Elliott Ave., Detroit, Mich.* A line of standard carbide cutting tools (not shown) include reamers, shell reamers, core drills, end mills, counterbores, and milling cutters. Vol. 84, p. 403.

DIE STEEL—*Bethlehem Steel Co., Bethlehem, Pa.* Advantages offered by this air-hardening die steel (not shown) are: good hardenability when air quenched, low quenching temperature, satisfactory machinability in annealed condition, high abrasion and wear resistance, ease of heat-treatment, and good hardness penetration. Analysis is: carbon, 1 per cent; manganese, 2; chromium, 2; molybdenum, 1. Dilatometric tests on 1-in. round specimens, heated and cooled at 400 F. per hr., gave the following ranges: heating: Ac range, 1,370 to 1,440 F.; cooling: Ar range, 1,300 to 580 F. Vol. 84, p. 188.

TOOL STEEL—*Bethlehem Steel Co., Bethlehem, Pa.* "Red Tiger" high-carbon, high-vanadium tool steel (not shown) is suitable for heavy hogging cuts, as well as fine finishing operations. Carbon content has been increased to give extra hardness, averaging 65 to 68 Rockwell C after heat-treatment. Physical tests show impact properties approximately the same as those of standard carbon 18:4:1 high-speed steel. High shock-resisting properties make possible intermittent cuts without breakage. Good red hardness makes it suitable for heavy hogging cuts. This steel is supplied as bar stock, heat-treated tool bits, and turning plugs used with special toolholders. Vol. 84, p. 447.

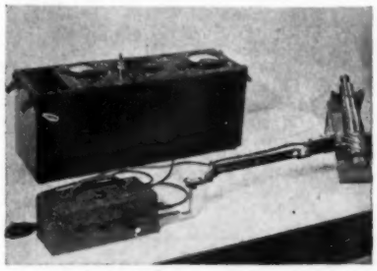
"TALIDE" CARBIDE—*Metal Carbides Corp., 107 E. Indianola Ave., Youngstown, Ohio.* "Talide" tungsten carbides (not shown) are available in practically any length, diameter or size, and in all practical shapes, such as strips, rods, bars, tubes, and rings. Pieces larger than 100 lb. can be produced. Strips, rods and bars in lengths of 16, 24 and 48 in. are made for wear-resisting applications. Vol. 84, p. 272.

DIE STEEL—*Jessop Steel Co., 595 Green St., Washington, Pa.* Steel for cold heading dies (not shown), made by a process to eliminate porous centers, can be used in either solid or open die cold-heading work. It is made from electric-furnace steel, grain size being carefully controlled to permit wide variation in hardening temperature without coarsening. Vol. 84, p. 486.

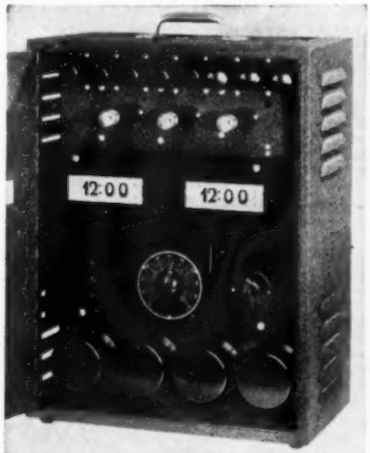
CUTTING MATERIAL — *McKenna Metals Co., 103 Lloyd Ave., Latrobe, Pa.* Grade K3H "Kennametal" tungsten-titanium carbide alloy (not shown) is said to combine unusual hardness with toughness. It is recommended as a tool tip material for light finishing cuts and for fairly heavy continuous cuts on steel of all hardnesses up to 550 Brinell. Tips are supplied in three standard shapes. It has a hardness of 79.0 Rockwell C and a strength of 210,000 lb. per sq.in. on transverse rupture. Vol. 84, p. 558.

"KENNAMETAL"—*McKenna Metals Co., 103 Lloyd Ave., Latrobe, Pa.* Grade K4 "Kennametal" (not shown) has a hardness of 92.0 Rockwell A and strength of 223,000 lb. per sq.in. (transverse rupture test). Due to its high thermal conductivity, together with its unusually high wear resistance, it is particularly applicable to machining hard, crumbly materials such as cast iron, Bakelite, porcelain, hard rubber, glass, casein, aluminum, hard bronze and similar materials. Vol. 84, p. 1050.

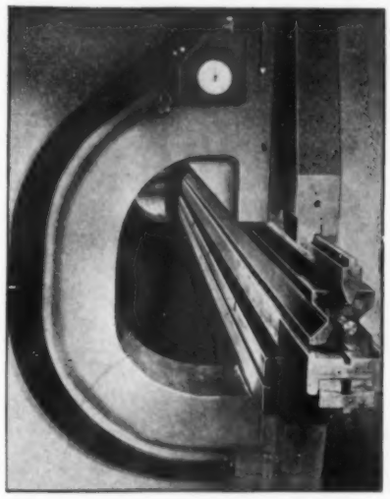
STELLITE—*Haynes Stellite Co., 30 E. 42nd St., New York, N.Y.* "Star J-Metal" cobalt-chromium-tungsten metal-cutting alloy (not shown) is a substantial improvement over the former standard "J-Metal" in life between grinds. It is recommended for all machining operations on cast iron, semi-steel, steel, etc. Vol. 84, p. 1108.



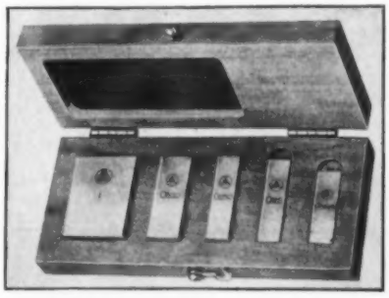
PROFILOMETER ACCESSORIES—*Physicists Research Co., 343 Main St., Ann Arbor, Mich.* Two profilometer accessories extend practical applications of instrument. "Mototrace" moves tracer across surfaces where available tracing distance is only $\frac{3}{32}$ to $\frac{1}{8}$ in. Type 1 special tracer measures roughness inside holes as small as ½ in. in diameter. Vol. 84, p. 806.



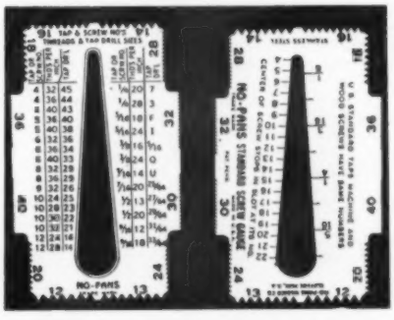
WELDING CHECKER—*Harris Calorific Co., Cleveland, Ohio.* "Master Mind," developed in conjunction with Robert E. Kinkead, determines quality of arc welds while they are being made. Red and green lights on control instrument and in head shield indicate weld quality. Vol. 84, p. 801.



TONNAGE INDICATOR—*Steelweld Machinery Div., Cleveland Crane & Engineering Co., Wickliffe, Ohio.* A tonnage indicator for "Steelweld" bending presses has two pointers, the "job" pointer which registers tonnage for the individual job, and the "maximum load" pointer which indicates the maximum load at which the press has ever been operated. Vol. 84, p. 846.



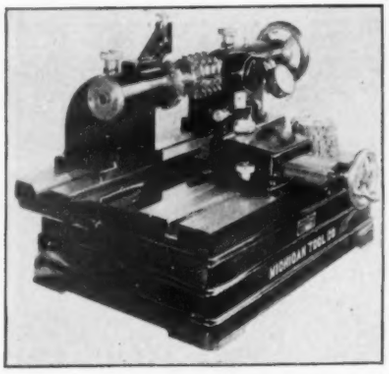
GAGE BLOCKS—*George Scherr Co., 128 Lafayette St., New York, N.Y.* "Mechanic's Own" set has been added to the line of "Ultra-Chex" precision gage blocks. Set consists of gage blocks accurate to within 8 millionths of an inch. Vol. 84, p. 808.



SCREW GAGE—*No-Pans Washer Co., 383 Nelson Ave., Cliffside Park, N.J.* Standard screw gage gives sizes for machine screws from No. 4 to No. 22 and for wood screws from ⅛ to $\frac{7}{32}$ in. Vol. 84, p. 1101.

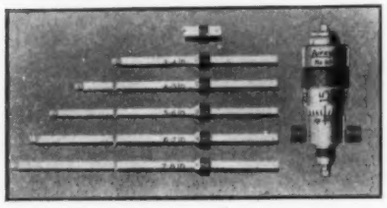
STRAIN GAGE—*Baldwin-Southwark Div., Baldwin Locomotive Works, Philadelphia, Pa.* Both static and dynamic types of the SR-4 bonded "Metalectric" strain gage (not shown) are available. Static type measures stress of 20 lb. per sq.in. in steel, and dynamic model will handle frequencies up to 30,000 cycles per second. Vol. 84, p. 804.

TOOLS and ACCESSORIES—Measuring Tools

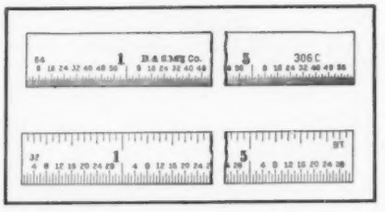


HOB CHECKING FIXTURE—*Michigan Tool Co., 7171 E. McNichols Rd., Detroit, Mich.* This fixture will check hobs for radial sharpening, spacing of flutes and runout of hubs. It can also be used for checking single-form relieved cutters or form gashing cutters for sharpening and spacing. It has a capacity of 12 in. diameter and 15 in. between centers. Vol. 84, p. 940.

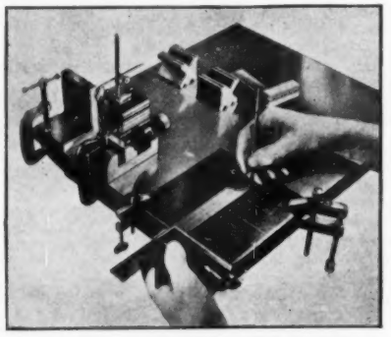
MEASURING TAPE—*Lufkin Rule Co., Saginaw, Mich.* "Chrome Face" steel measuring tape comes in ⅜ and ½ in. widths in leather cases, and ⅜ in. width in imitation leather cases. Vol. 84, p. 267.



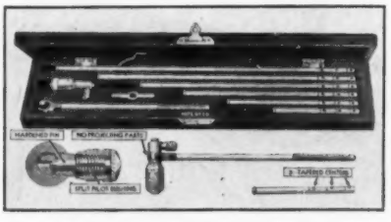
MICROMETERS—*Lufkin Rule Co., Saginaw, Mich.* Series 80 inside micrometers are substantially lower in price than the Series 680. Range is obtained by extension rods and collars, the No. 80A set having six rods and a ½ in. collar which provides a range of 2 to 8 in., and the No. 80B set having ten rods and a ½ in. collar, giving a range of 2 to 12 in. Both have ½ in. screw movement. Vol. 84, p. 484.



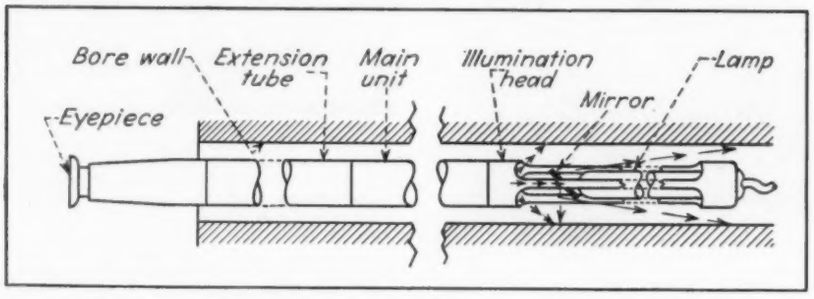
STEEL RULE—*Brown & Sharpe Mfg. Co., Providence, R.I.* No. 306C flexible steel machinists' rule is graduated in 16ths and 32nds of an inch on one side, and in 64ths of an inch on the other. Rule is approximately ½ in. wide and $\frac{1}{64}$ in. thick. Vol. 84, p. 944.



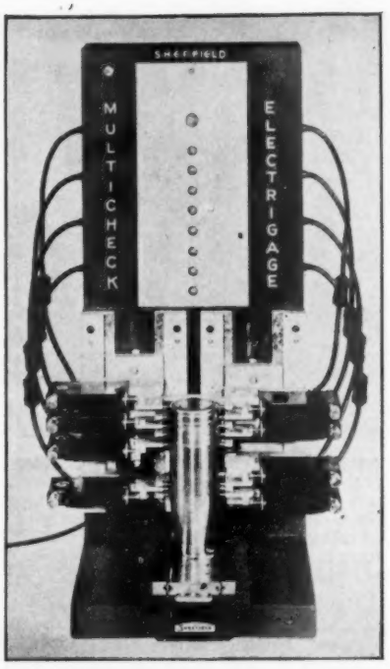
SURFACE PLATES—*Delta Mfg. Co., 620 E. Vienna Ave., Milwaukee, Wis.* These 3-in. thick 15x8 and 16x22 in. machine finished surface plates provide a true surface to start with, a massive design and properly ribbed casting to insure the surface remaining true, ledges at the edges for clamping, and edges that are square with each other and with the face. Vol. 84, p. 944.



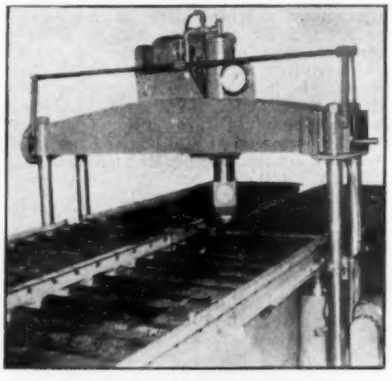
INSIDE MICROMETER—*Pacific Specialty Supply Co., 344 N. Vermont Ave., Los Angeles, Calif.* "International" inside micrometer is available with two groups of measuring rods. Set No. 4A has a capacity from 1½ to 12 in. with seven measuring rods, while set No. 4B measures from 1½ to 6 in. with three measuring rods. All rods and the micrometer head have hardened and ground points. Vol. 84, p. 398.



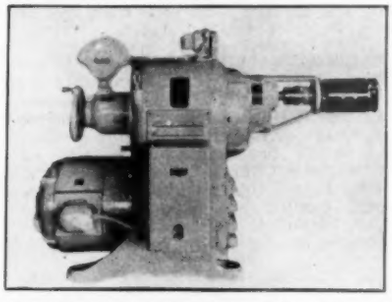
BORE INSPECTION TELESCOPE—*Gaertner Scientific Corp., 1201 Wrightwood Ave., Chicago, Ill.* A clear view, much enlarged, of the inner walls of gun barrels, tubing, pipes, boiler tubes, and similar members up to a depth of 20½ ft. is provided with Model M 2125 bore inspection telescope. Small holes, cracks, pits, scratches and other defects are readily seen. Inspection can be made in tubes 1 to 4 in. in diameter. Vol. 84, p. 994.



"MULTICHECK" GAGE—*Sheffield Gage Corp., Dayton, Ohio.* "Multicheck Electrigage," for simultaneous checking of several critical dimensions, is particularly adaptable for inspection of timing fuse elements, shell bodies, cartridge cases and other munitions items. Measurements of length, diameter and depth are flashed simultaneously on a control board. An individual gaging head is used for each dimension to be checked. One operator can check seven 75-mm. shell dimensions at 600 per hr. without eyestrain. Vol. 84, p. 941.

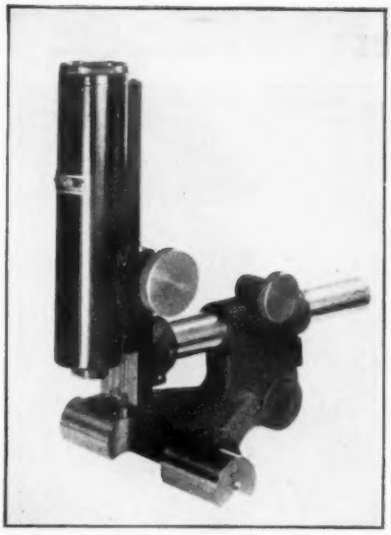


HARDNESS TESTER—*Detroit Testing Machine Co., 9390 Grinnell Ave., Detroit, Mich.* This Brinell hardness tester inspects wide plates at any point without removal from conveyor. Vol. 84, p. 939.

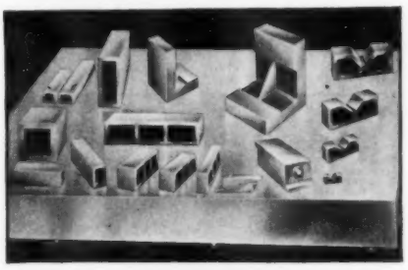


GENERATOR TESTER—*U.S. Electrical Motors, Inc., 80 34th St., Brooklyn, N.Y.* A test stand providing an infinite number of speeds has been developed for testing aircraft generators, vacuum pumps, hydraulic pumps, alternators, etc. Positive speed changing is provided. Vol. 84, p. 843.

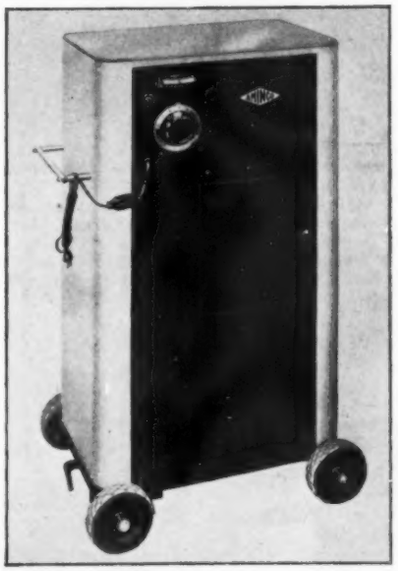
Gages—TOOLS and ACCESSORIES



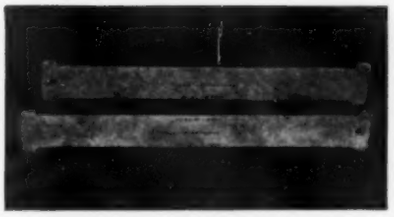
THREAD TOOL GAGE — *Gaertner Scientific Corp., 1201 Wrightwood Ave., Chicago, Ill.* Rapid, accurate set-up of single point threading tools is made possible by this optical thread tool gage. Instrument is suitable for work from ⅜ in. to 6½ in. in diameter. Magnification is about 12 times. Vol. 84, p. 640.



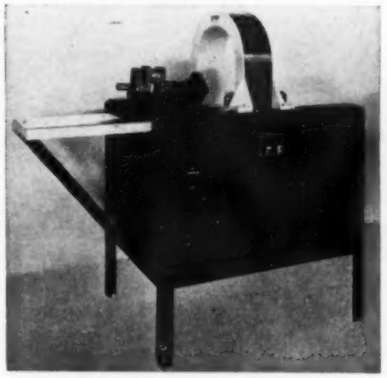
SURFACE PLATE EQUIPMENT—*Challenge Machinery Co., Grand Haven, Mich.* Surface plate equipment consists of ribbed and box parallels in several sizes, V-blocks up to 6x8x8 in., adjustable leveling blocks, and a wide range of angle plates. Vol. 84, p. 228.



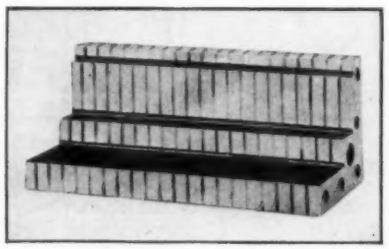
AREA DETERMINATOR—*American Instrument Co., 8010–8020 Georgia Ave., Silver Spring, Md.* "Aminco" area determinator rapidly measures area of any flat object of any shape, color or texture that will fit into circle 9.93 in. in diameter. Useful for maps, drawings, graphs, photographs, engine indicator diagrams, etc. It is accurate within 3 per cent. Vol. 84, p. 442.



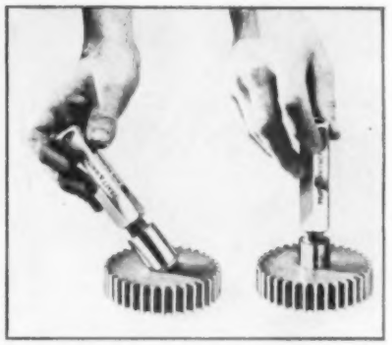
CYLINDER GAGES—*McKenna Metals Co., 103 Lloyd Ave., Latrobe, Pa.* Go and no-go gages tipped with "Kennametal" are made for cylinders, tubing and similar parts. They consist of notched steel blanks with small carbide pieces brazed at both ends. Vol. 84, p. 484.



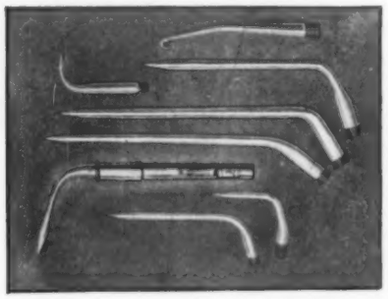
DEMAGNETIZERS—*Magnaflux Corp., 5916 Northwest Highway, Chicago, Ill.* Type SB demagnetizers, for use with d.c. Magnaflux inspection units, are made in openings of 5x7, 9x11, 14x16, and 28x14 in. Improvements include approximate doubling of demagnetizing efficiency and great reduction in coil length. Vol. 84, p. 803.



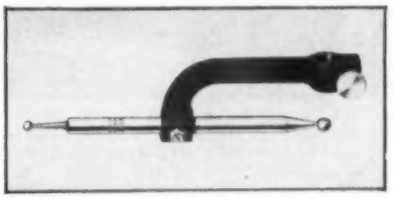
MAGNETIC BLOCK—*George Scherr Co., 128 Lafayette St., New York, N.Y.* "Magne-Blox" angle holds work of all types on magnetic chucks. It consists of a series of steps measuring ⅛, ⅜, ½, 1⅛ and 1⅝ in. upon which may be placed pieces for surface grinding without complicated clamps and attachments. Over-all dimensions are 3x3x7½ in. Vol. 84, p. 560.



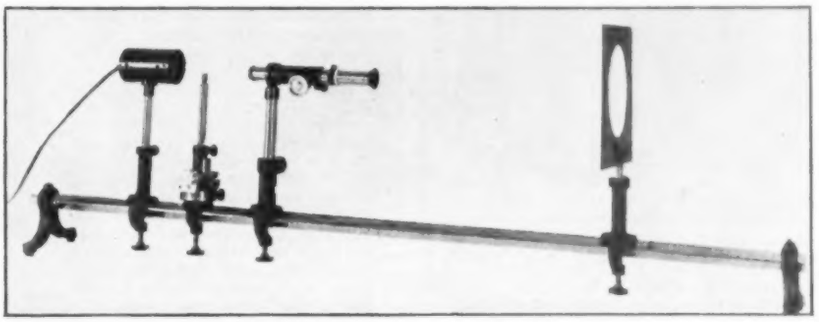
PLUG GAGE—*Pratt & Whitney Div., Niles-Bement-Pond Co., West Hartford, Conn.* "Pilot" plug gages are easily inserted in holes. A chamfer at the end and an annular groove near the end permit easy entry, and the gage centralizes itself, lines up and enters without jamming. Vol. 84, p. 646.



"ANG-LITE" UNITS—*Diagnostic Ultra-Lite Co., 170 Broadway, New York, N.Y.* Designed to provide light at various angles in deeply recessed areas, Lucite "Ang-Lites" are hand-tooled and practically unbreakable. Made in various stock shapes and sizes with ⅜, ½ and ⅝ in. diameter at threaded end. Handle is specially designed pocket flashlight. Units are available with small transformer. Vol. 84, p. 553.

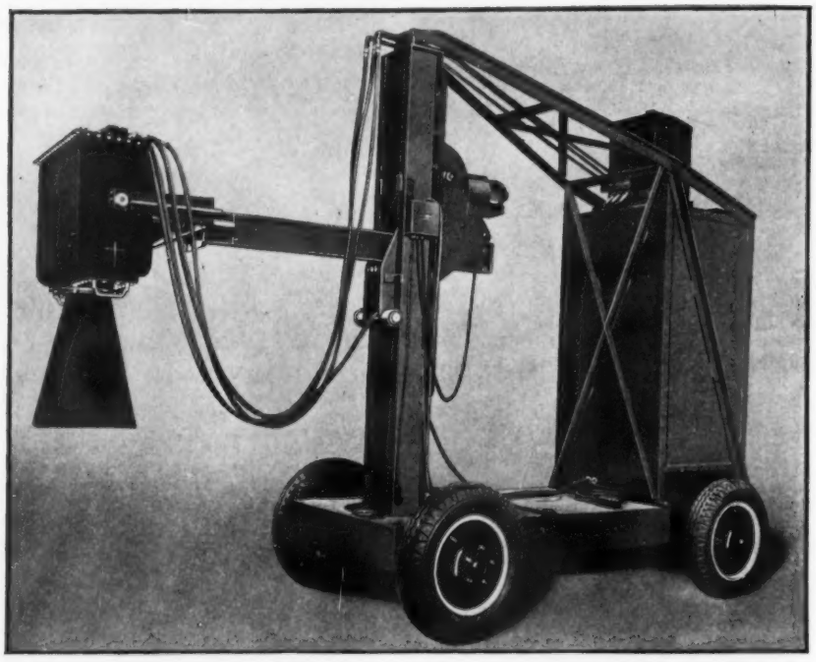


INDICATOR ATTACHMENT—*Brown & Sharpe Mfg. Co., Providence, R.I.* For dial indicators having 0.375-in. stems, the Nos. 729C and 729D hole attachments adapt indicators for testing internal and other surfaces which cannot be reached with the dial gage spindle. Vol. 84, p. 272.



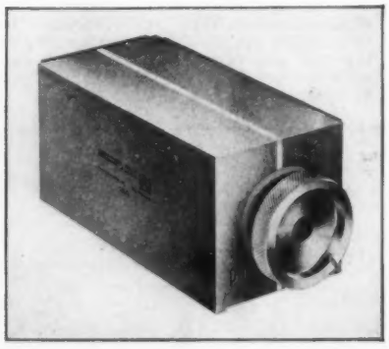
PROJECTION COMPARATOR—*Gaertner Scientific Corp., 1201 Wrightwood Ave., Chicago, Ill.* Using standard optical bench parts, this projection comparator provides magnification of 50 times or more. Vol. 84, p. 639.

TOOLS and ACCESSORIES—Inspection Machines, Gages

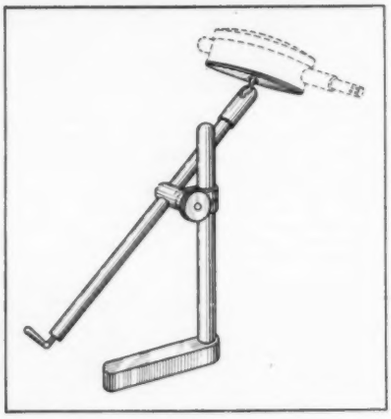


X-RAY UNIT—*General Electric X-Ray Corp., 2012 Jackson Blvd., Chicago, Ill.* Developed for foundries and welding shops, No. OX-220 mobile X-ray unit permits examination of 3-in. rolled steel or 3½-in. cast iron or steel on a production basis. Entire high-voltage system is mounted in a shock-proof oil-filled container. All controls are housed in a lead-lined steel cab. Vol. 84, p. 186.

MAGNETIC BLOCKS—*George Scherr Co., 128 Lafayette St., New York, N.Y.* "Magne-Blox" magnetic parallel and V-block set for magnetic chucks consists of two 1x1¾x3¾ in. parallels and 1¾x2⅜x1⅞ in. V-blocks. Vol. 84, p. 314.

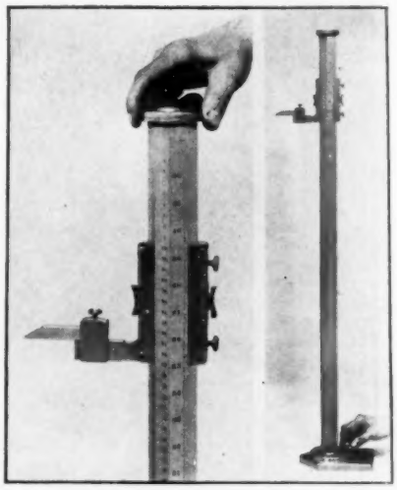


MAGNETIC BLOCK — *Brown & Sharpe Mfg. Co., Providence, R.I.* Measuring 2½x5¼ in., this No. 760 permanent magnet toolmaker's block features control to switch magnetic force off and on. It measures 2$\frac{3}{16}$x2½x6$\frac{5}{16}$ in. Vol. 84, p. 400.

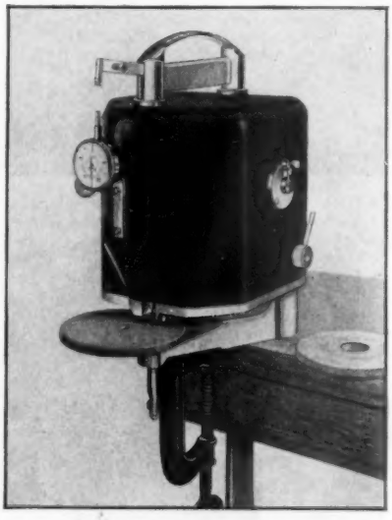


DIAL GAGE HOLDER—*red E set Co., 89 State St., Boston, Mass.* "red E set" dial indicator holder is made with a ball and socket joint and remote control. Capable of holding all makes of dial gages, both old and new, this device has a ⅜-in. square base to fit any toolholder. Primary adjustment, easily accessible and 5½ in. away from the work, does 90 per cent of the adjusting. A secondary adjustment permits approximate positioning of the instrument. Vol. 84, p. 778.

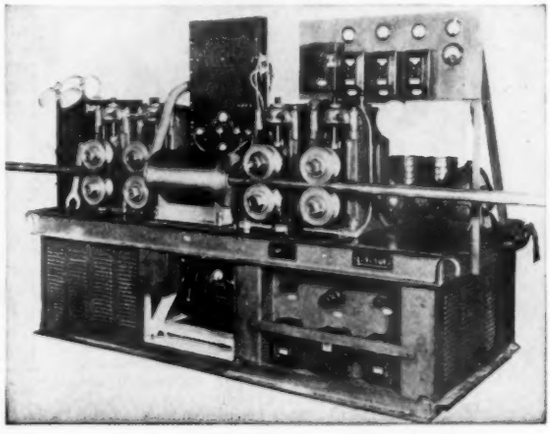
TUBE INSPECTOR—*Sperry Products, Inc., 1505 Willow Ave., Hoboken, N.J.* With this non-destructive electric defect detector tubing having either magnetic or non-magnetic properties can rapidly be inspected for many types of flaws. Machine will detect surface flaws, checks, cracks, and slivers on both internal and external surfaces; discontinuous defective welds, and long laminations. It is also useful in detecting "cupping" in lengths of bar stock. Efficient operation is facilitated by table mounting of amplifiers, energizing and detector coils, drive rolls and controls. Underneath the table are mounted a motor-generator set, roll drive motors and other related parts. Vol. 84, p. 805.



HEIGHT GAGE—*George Scherr Co., 128 Lafayette St., New York, N.Y.* The 40-in. Chesterman height gage is equipped with a quick-locking adjustment on the slide, knurled knob at the head for fine adjustments, and superfine adjustment screw at the base. Triangular beam prevents sway while making readings. Tool is graduated in both English and metric scales. Vol. 84, p. 72.



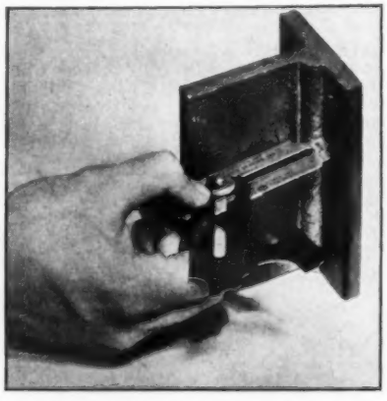
ABRASIVE GRADER—*Abrasive Engineering Corp., 15947 Turner Ave., Detroit, Mich.* The portable Type P "Grade-O-Meter" accurately grades grinding wheels of practically any size. Vol. 84, p. 268.



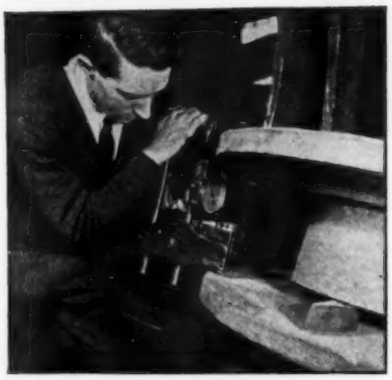
Measuring Tools, Gages—TOOLS and ACCESSORIES

SPACING MACHINE—*G. F. Wittman Co., 20 Northwood Ave., Dayton, Ohio.* Recommended especially for experimental work and short-run production is this improved spacing machine. Two styles are available—spacers and follow-up presses. Punching capacity is 15,000 lb. Vol. 84, p. 1104.

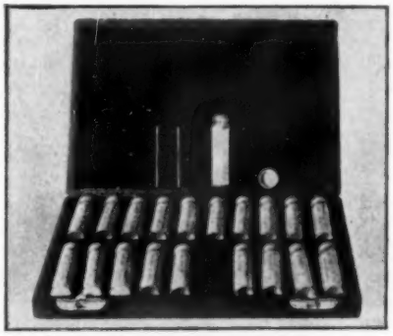
UNIVERSAL GAGE—*Continental Machines, Inc., 1301 Washington Ave. S., Minneapolis, Minn.* "Doall" height and depth gage is furnished with rods which measure up to 6 in. It can be used as a height gage, depth gage, and inside parallel surface gage. Vol. 84, p. 314.



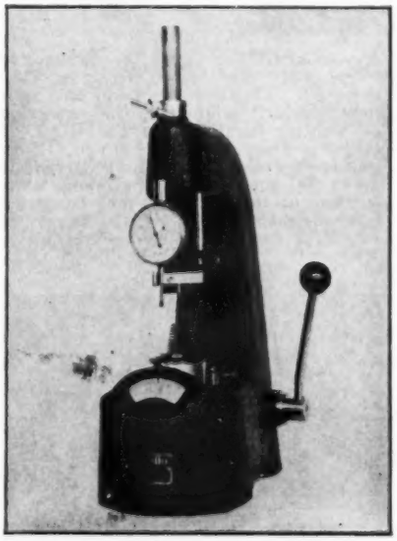
FILLET-WELD GAGE—*General Electric Co., Schenectady, N. Y.* Sizes of fillet welds are easily checked with this gage. Consists of three stainless-steel stampings held together by a bolt and thumb nut; checks either convex, concave or standard fillets. Vol. 84, p. 226.



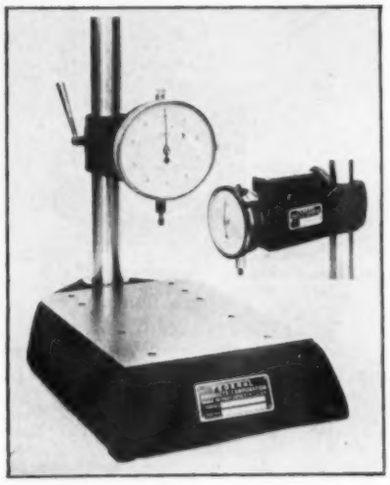
BRINELL TESTER—*Andrew King, 521 Broad Acres Road, Narberth, Pa.* Designed to make standard Brinell hardness test, using 3,000-kg. load on 10-mm. ball, the Knerr-King portable tester weighs less than 26 lb. complete. Large parts, up to throat capacity of 4 in. deep and 10 in. high, are tested where they lie. Vol. 84, p. 32.



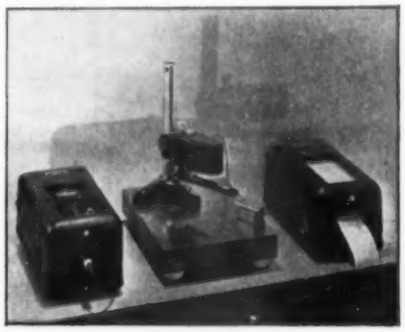
MEASURING WIRES—*Van Keuren Co., 176 Waltham St., Watertown, Boston, Mass.* No. 261N measuring wires are suitable for checking internal spur gears. The series is based on sizes 1.44/DP. This gives a maximum number of sizes exact in even thousandths. Vol. 84, p. 479.



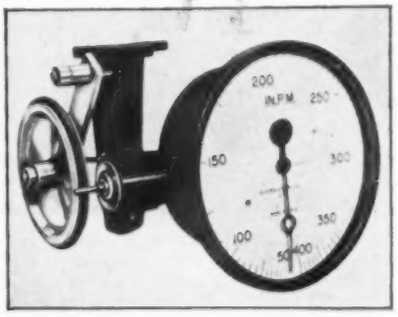
SPRING CHECKER—*Link Engineering & Mfg. Co., 1054 W. Baltimore Ave., Detroit, Mich.* A rapid, accurate method of testing compression springs is provided by the No. PB3 spring checker. Standard model handles springs up to 6 in. free height and 2⅝ in. diameter. Vol. 84, p. 182.



COMPARATOR—*Federal Products Corp., 1144 Eddy St., Providence, R.I.* Recommended especially for setting and checking other gages to be used in production inspection, but also suitable for being used directly in production, Model NB-60 comparator is improved by supporting the indicator by the back instead of by the stem. Redesigned base has only three feet. No. AN-4 attachment, shown in the inset, can be furnished for fine setting of the indicator. Vol. 84, p. 312.

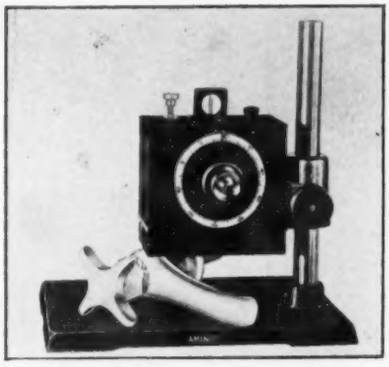


SURFACE ANALYZER—*Brush Development Co., 3311 Perkins Ave., Cleveland, Ohio.* "Surface Analyzer" records amplitude and number of surface irregularities. Values in fractions of microinches may be determined. Analyzer includes four separate units: analyzer head, amplifier, direct inking oscillograph and surface plate. Vol. 84, p. 222.

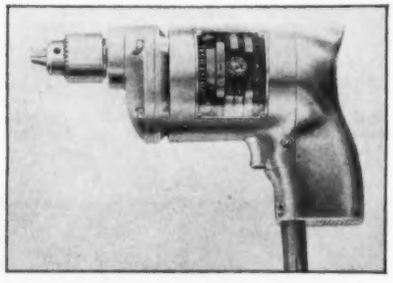


TACHOMETER—*O. Zernickow Co., 15 Park Row, New York, N.Y.* Stationary tachometers feature ball bearing pendulum pivots, ball bearing swivel link, and ball bearing driving spindle, making the tachometer free running. Accuracy is held to within 0.5 per cent. Instruments have a 6-in. dial mounted on a 2¾-in. deep housing, and weigh, with brackets, 2¾ lb. Vol. 84, p. 444.

TOOLS and ACCESSORIES—Portable Tools

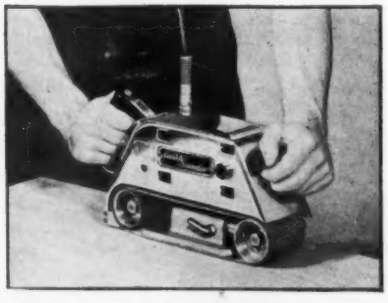


THICKNESS GAGE—*American Instrument Co., 8010–8020 Georgia Ave., Silver Springs, Md.* Improved "Aminco-Brenner Magne-Gage" magnetically measures types and thicknesses of coatings with only one instrument, simply by interchanging magnets. Method is rapid and does not harm coating or base metal. Vol. 84, p. 68.



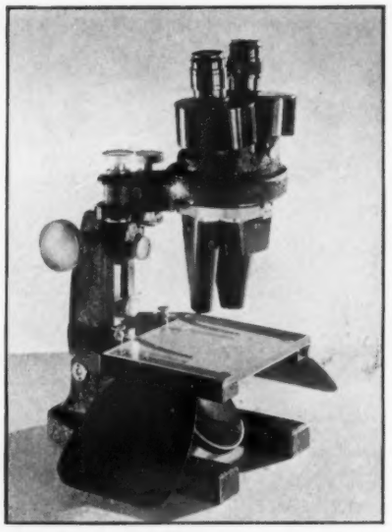
PORTABLE ELECTRIC DRILLS—*Chicago Pneumatic Tool Co., 6 E. 44th St., New York, N.Y.* Having capacity up to ¼ in. in metal or wood, the No. 806 and No. 808 universal electric drills have free speeds of 2,500, 3,500 or 5,000 r.p.m. Companion No. 806-SC screw drivers are available with free speeds of 500, 750, 1,000 or 1,500 r.p.m. and will drive No. 8 wood screws or $\frac{5}{16}$-in. machine screws. Vol. 84, p. 34.

DISK SANDER PAD—*Columbian Rope Co., Auburn, N.Y.* "Co-Ro-Felt" light-weight backup disk sander pad (not shown) has a molded plastic center and is available in 7, 8 and 9 in. sizes. Vol. 84, p. 231.

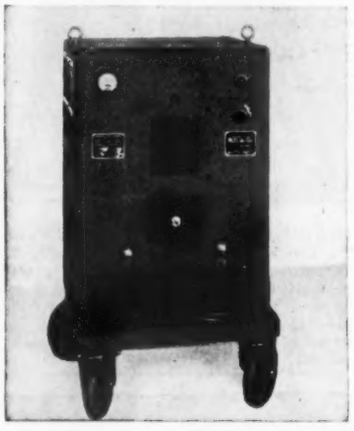


SANDER—*Syracuse Guild Tool Co., 1720 N. Salina St., Syracuse, N.Y.* Type G-3 "GuildSander" uses standard 3-in. wide and 24-in. long abrasive belts. With a belt speed of 1,350 ft. per min., this tool is suitable for sanding wood, metal, marble, slate, plastics. Equipped with a ½-hp. motor. Vol. 84, p. 402.

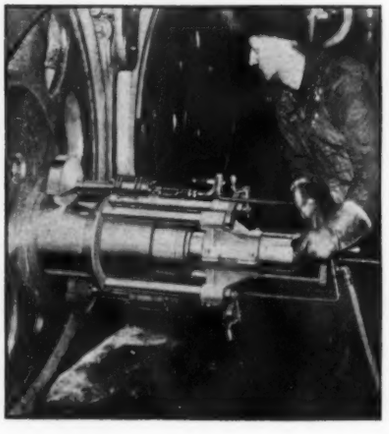
CRANKPIN GRINDER—*Goetz-Voss Corp., 6242 W. State St., Wauwatosa, Wis.* Available with either pneumatic or electric drive, the "Milwaukee" portable locomotive crankpin grinder fits all types and sizes of cranks. Only siderods need be removed. Vol. 84, p. 480.

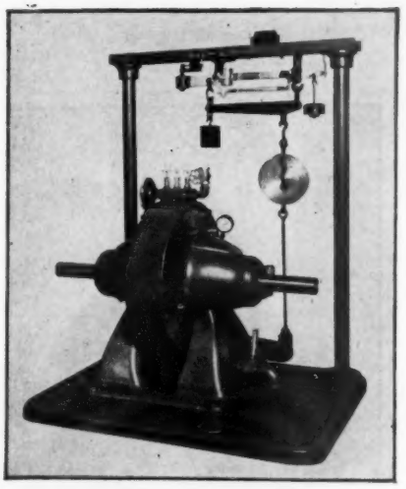


MICROSCOPES—*Spencer Lens Co., Buffalo, N.Y.* Series of improved stereoscopic microscopes produces vivid images, great depth of focus, large object field, and high resolution. They have four mechanical arrangements. Magnifications range from 6.3X to 144X. Vol. 84, p. 392.

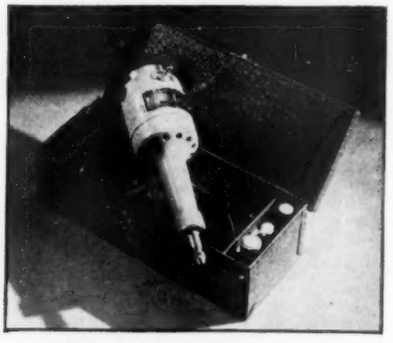


MAGNAFLUX UNIT—*Magnaflux Corp., 5916 Northwest Highway, Chicago, Ill.* This portable inspection unit is particularly adapted to the inspection of welds. Identified as the KQ-1, it operates from 220- or 440-volt, three-phase, 60-cycle a.c. Output current is up to 600 amp. d.c. for continuous service, and up to 1,200 amp. may be drawn intermittently. Unit is also made in the Type KQ-04, which delivers up to 400 amp. Vol. 84, p. 803.

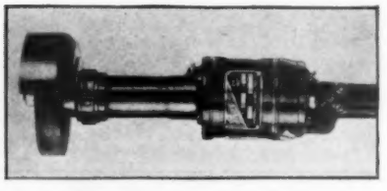




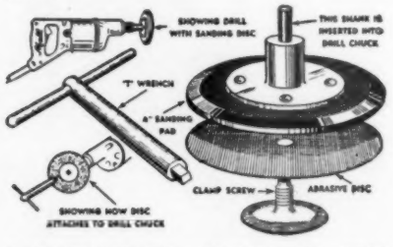
HYDRAULIC DYNAMOMETERS—*Taylor Sales Co., 2330 W. Clybourn St., Milwaukee, Wis.* Improved "Hi-Eff" hydraulic absorption dynamometers are available in a wide range of sizes, to 10,000 hp. and 25,000 r.p.m., suitable for both high speed-low torque and low speed-high torque. Accuracy is said to be 99.7 per cent. Vol. 84, p. 183.



GRINDER CASE—*Dumore Co., Racine, Wis.* Steel carrying case protects Nos. 8 and 10 hand grinders, measures 11x4¼x3¼ in. and contains compartment for storing extra grinding wheels, abrasive bands and arbors. Vol. 84, p. 996.



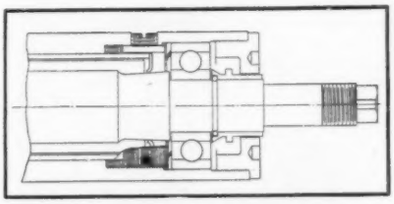
AIR GRINDER—*Independent Pneumatic Tool Co., 610 W. Jackson Blvd., Chicago, Ill.* No. 255 "Thor" portable air grinder assures positive starting under all operating conditions. Vol. 84, p. 692.


SHOWING DRILL WITH SANDING DISC
THIS SHANK IS INSERTED INTO DRILL CHUCK
"T" WRENCH
6" SANDING PAD
CLAMP SCREW
ABRASIVE DISC
SHOWING HOW DISC ATTACHES TO DRILL CHUCK

SANDING PADS—*Mall Tool Co., 7740 S. Chicago Ave., Chicago, Ill.* Designed for use on any make, model, or size of portable electric drill, an improved sanding pad consists of a 4-in. pad, one abrasive disk, a clamp screw to hold the abrasive and pad in place, and a T-wrench. Vol. 84, p. 76.

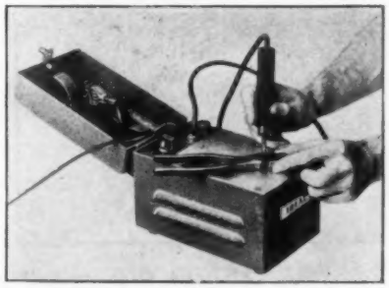
Portable Tools—TOOLS and ACCESSORIES

SANDER—*Detroit Surfacing Machine Co., 7433 W. Davison, Detroit, Mich.* "Easy" portable electric sander is powered by a specially designed universal motor having grease-sealed ball bearings. Forced ventilation is provided. Complete sander weighs 6½ lb. Vol. 84, p. 442.

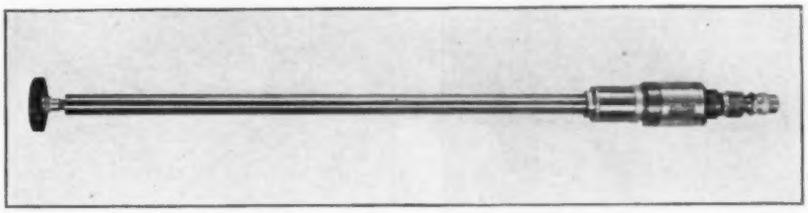


GRINDING QUILLS—*Dumore Co., Racine, Wis.* Long bearing life and precision performance are assured by preload adjustment for ball bearings used in grinding quills. Amount of preload is determined by a stiff spring adjusted by an internal nut. Vol. 84, p. 354.

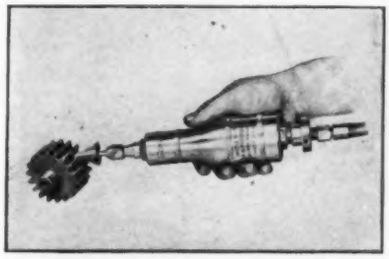
MIDGET TOGGLE PLIER — *Knu-Vise, Inc., 16841 Hamilton Ave., Detroit, Mich.* This midget toggle plier was developed especially for the aircraft industry. Over-all length is only 3 in. Made from SAE 1029 steel, hardened and tempered, it provides a leverage of 90:1. Vol. 84, p. 995.



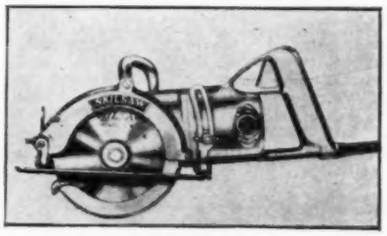
ELECTRIC ETCHER—*Ideal Commutator Dresser Co., 1057 Park Ave., Sycamore, Ill.* Everything safely inclosed is the most outstanding feature of the No. 13 "Universal" portable electric etcher. Heats are 120, 240, 420 and 700 watts. Vol. 84, p. 690.



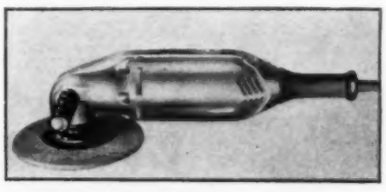
PNEUMATIC GRINDERS — *Rotor Tool Co., 17325 E. Euclid Ave., Cleveland, Ohio.* Two production-type die grinders use wheels from ½ to 2½ in. in diameter. No. M-825 grinder shown features an extension of either 13 or 26 in. for cleaning up the inside of shell. No. M-826 grinder is designed for getting into otherwise inaccessible places, the side to center distance being only $\frac{13}{32}$ in. Speed of this grinder is 17,000 or 21,000 r.p.m. Vol. 84, p. 554.



PNEUMATIC GRINDER—*M-B Products, 130 E. Larned St., Detroit, Mich.* Model U-TR "Utility" pneumatic grinder is equipped with grease-sealed precision bearings. Tool develops a speed of 60,000 r.p.m. Weight is 2¼ lb. Vol. 84, p. 152.

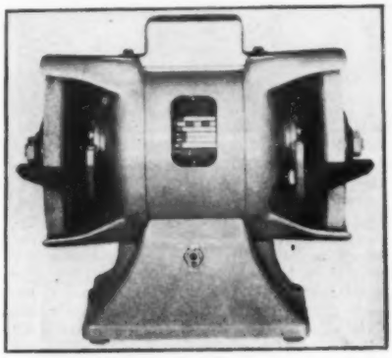


PORTABLE SAW—*Skilsaw, Inc., 5022 Elston Ave., Chicago, Ill.* Model 67 heavy-duty 6-in. portable electric saw cuts to a depth of 1⅞ in.; will rip and cross-cut hard wood up to 1 in., and bevel cut lumber $1\frac{3}{16}$ in. thick at 45 deg. Blade speed, 3,400 r.p.m. Vol. 84, p. 738.

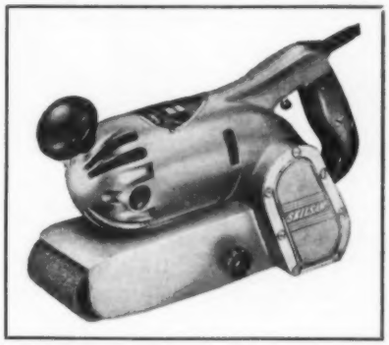


DISK SANDERS—*Skilsaw, Inc., 5033 Elston Ave., Chicago, Ill.* Model SP disk sander is a two-speed heavy duty sander and polisher. Speeds of 4,200 and 1,300 r.p.m. are provided. Model H2, illustrated, first uses a 9-in. disk at 2,700 r.p.m., then a 7-in. disk at 4,200 r.p.m. Model SL, for heavy-duty work, operates at 5,000 r.p.m. Vol. 84, p. 690.

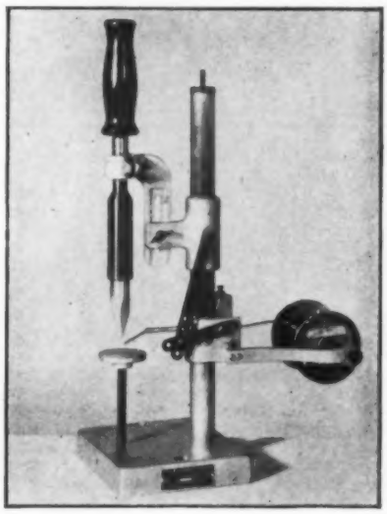
SOLDERING MACHINE — *Electric Soldering Iron Co., Deep River, Conn.* Any industrial soldering iron may be used with this spot soldering machine. Machine is operated by a treadle. Solder is automatically fed. Vol. 84, p. 684.



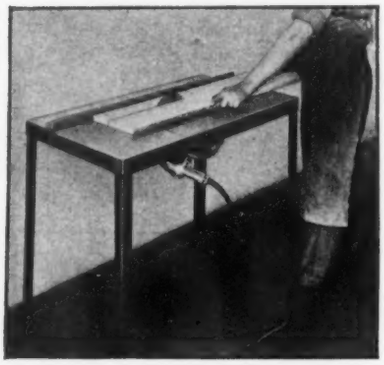
BENCH GRINDER—*Baldor Electric Co., 4357 Duncan Ave., St. Louis, Mo.* Ball bearing bench grinder is powered with a capacitor motor which can be overloaded repeatedly without injury. Tool rests are adjustable to and from the 6x⅝-in. wheels. A ¼-hp. motor is used. Vol. 84, p. 520.



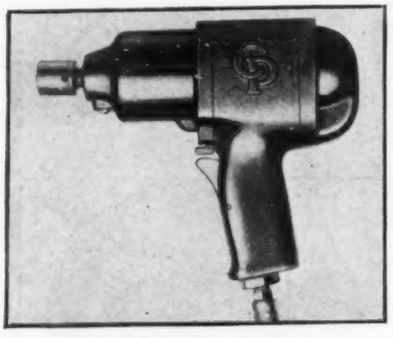
SANDER—*Skilsaw, Inc., 5033-43 Elston Ave., Chicago, Ill.* "Zephyrplane Junior" 2¼-in. belt sander is suitable for "clean up" work and for many final finish operations. A patented control lever permits quick belt changes. Sander weighs only 9½ lb. Vol. 84, p. 992.



TOOLS and ACCESSORIES—Portable Tools



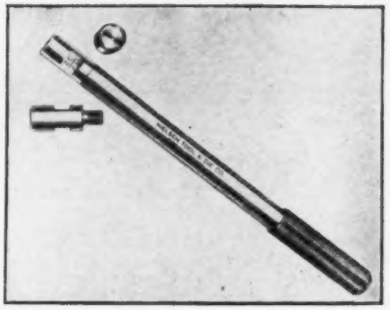
SAW TABLE—*Van Dorn Portable Electric Tools, Towson, Md.* This portable saw table converts the No. 85 "Quick-Saw" to saw table use for maintenance operations. Table of the portable saw locks in place in the center of the table top and all depth and angle adjustments of the portable saw can be made in saw-table use. Table is made of heavy metal with demountable legs. Vol. 84, p. 556.



PNEUMATIC WRENCHES—*Chicago Pneumatic Tool Co., 6 E. 44th St., New York, N. Y.* Reversible pneumatic wrenches employ slow-speed "Power-Vane" rotary motors. Three models, Nos. 344-R, 349-R and 360-R, handle bolts of ⅜, ⅝ and ¾ in. respectively. Vol. 84, p. 731.

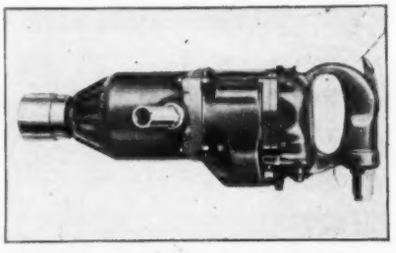
FLEXIBLE-SHAFT MACHINE—*R. G. Haskins Co., 2760 W. Flournoy St., Chicago, Ill.* Bench-type flexible shaft machines have a redesigned round base to provide maximum stability with minimum bench space. Motor swivels 360 deg. Units are furnished in ¼ and ½-hp. sizes. Vol. 84, p. 354.

RECIPROCATING TOOL—*H & H Research Co., 1925 W. Buena Vista, Detroit, Mich.* Series C reciprocating-action tool has over three times the power of previous models. With a ⅝-in. stroke, this machine develops a 30- to 40-lb. push or pull at the end of the chuck. It may be used to file, burr, hone, snag, polish, saw and chip. Under full load it travels at 1,250 to 1,400 strokes per minute. Vol. 84, p. 520.

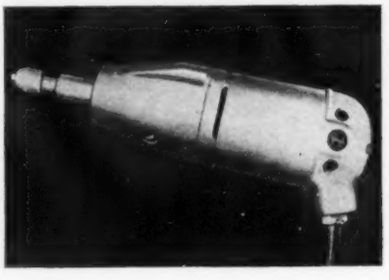


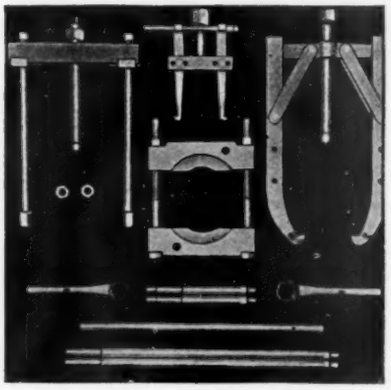
LAYOUT PUNCHES—*Nielsen Tool & Die Co., Berkley, Mich.* Transferring holes through drilled sections is made possible by these layout punches, available in diameters from 17/64 to 59/64 in. Case-hardened tips are removable for replacement. Vol. 84, p. 598.

PORTABLE HAMMER—*Independent Pneumatic Tool Co., 610 W. Jackson Blvd., Chicago, Ill.* "Thor-Nado" electric hammer featuring "Sling-Shot Drive" measures 13½ in. long and weighs only 14 lb. It is adapted to heavy-duty applications. Drive whips the piston back and forth at 1600 blows per min. There is no metal connection between the piston and the gear train and motor. Vol. 84, p. 227.

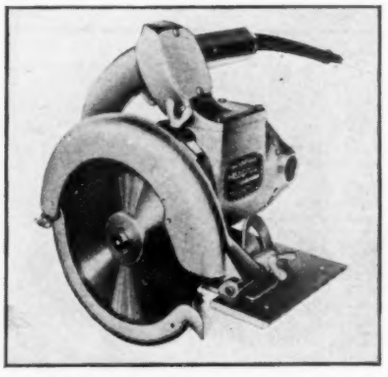


REVERSIBLE WRENCHES—*Chicago Pneumatic Tool Co., 6 E. 44th St., New York, N. Y.* Nos. 365-R and 375-R reversible power wrenches employ "Power Vane" slow-speed rotary pneumatic motors. They have no gears or resilient members in the drives. No. 365-R handles 1½-in. bolts. No. 375-R handles 1¾-in. bolts. Vol. 84, p. 268.

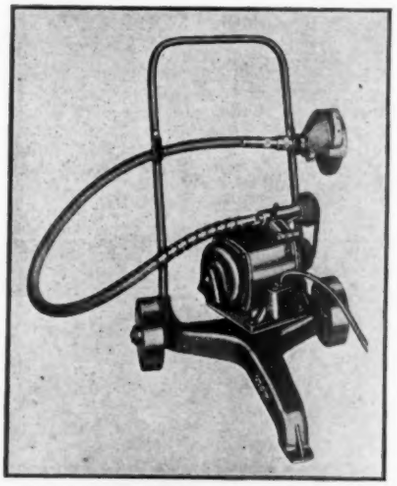




PULLERS—*Owatonna Tool Co., 353 Cedar St., Owatonna, Minn.* A complete set of pulling tools built especially for industrial maintenance work is offered. Vol. 84, p. 594.



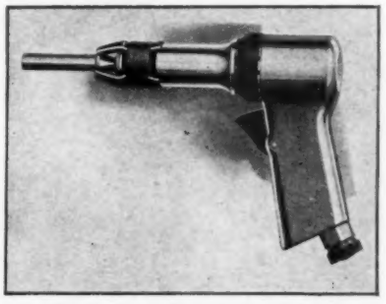
PORTABLE SAW—*Black & Decker Mfg. Co., Towson, Md.* No. 85 "Quick-Saw" is a balanced, close-coupled one-hand saw having a 2⅝ in. depth of cut. It has a wide variety of uses such as ripping, cross-cutting, grooving, slotting, mortising, planing, mitering, beveling, tenoning, nail cutting, notching, at high speed in all types of wood. Vol. 84, p. 479.



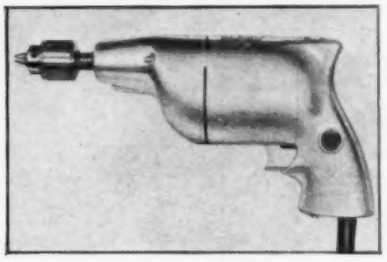
FLEXIBLE SHAFT UNIT—*Stow Mfg., Co., Binghamton, N.Y.* This flexible shaft machine designed for easy portability, uses a two-wheel truck mounting which carries either the direct-connected motor-and-shaft unit or the multi-speed belt-and-pulley driven unit. It is recommended for heavy work. Vol. 84, p. 312.

"PIX-UP" TRAY—*Independent Pneumatic Tool Co., 610 W. Jackson Blvd., Chicago, Ill.* An increase of from three to nine times in speed of power-driving screws is claimed for the Thor "Pix-Up" finder and "Adjusto-Tray." This device sorts, picks up and holds screws for driving. Tray is non-magnetic. Finder can be fitted to any Thor power screw driver. Vol. 84, p. 994.

RATCHET THREADER—*Toledo Pipe Threading Machine Co., Toledo, Ohio.* "Simpact" self-contained 1- to 2-in. ratchet threader permits dies to be changed quickly. Dies are backed by tapered steps. Vol. 84, p. 640.

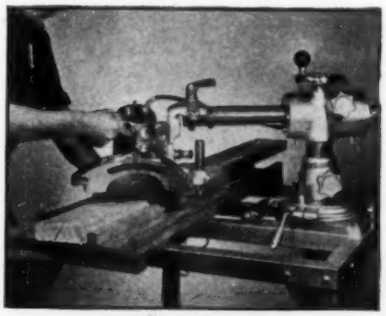


RIVETING HAMMER—*Ingersoll-Rand Co., 11 Broadway, New York, N. Y.* Type AV light-weight air riveting hammer is suitable for fabricating iron, steel and aluminum products. It is available in a short-stroke, fast-hitting model for ordinary use; and a long-stroke, slow-hitting machine, designed for aluminum, dural or soft iron rivets. Vol. 84, p. 354.



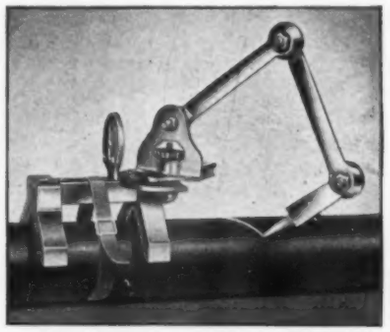
PORTABLE TAPPER—*Black & Decker Mfg. Co., Towson, Maryland.* "Tapgun," weighs only 3¾ lb. and measures 9¼ in. over-all. It taps up to $\frac{5}{16}$ in. in cast iron, $\frac{3}{8}$ in. in steel, and $\frac{7}{16}$ in. in brass or aluminum. Machine taps at 400 r.p.m. and backs out at 525 r.p.m. Vol. 84, p. 692.

"PORTO-POWER" SETS—*Blackhawk Mfg. Co., 5025 W. Rogers St., Milwaukee, Wis.* "Porto-Power" hydraulic ram kit contains 4, 7 and 20-ton rams, plus "Spee-D-Coupler" to connect the same pump and hose to any one of these rams. "Duck-Bill" spreader adapts the plunger action of the 10-ton ram to spreading sheet metal and other assemblies. Vol. 84, p. 641.



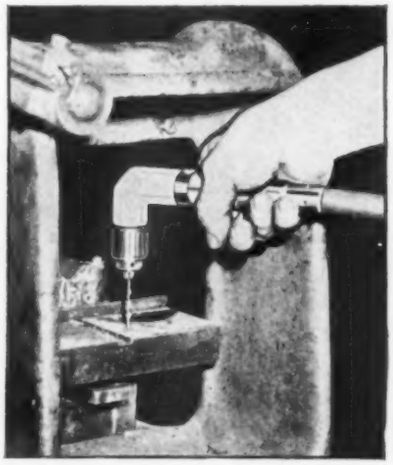
SAW ARM—*Porter-Cable Machine Co., Syracuse, N. Y.* A radial arm for supporting "Speedmatic" electric hand saws speeds maintenance operations. Arm provides a stroke of 26 in. Rib guides may be placed to the rear so that stock 65 in. wide may be halved, and the arm may be raised 7¼ in. by a large handwheel. Cut-off capacity is 4½ in. deep with a 26 in. stroke. Vol. 84, p. 556.

PORTABLE NIBBLER—*Independent Pneumatic Tool Co., 600 W. Jackson Blvd., Chicago, Ill.* "Thor" portable electric nibbler is only 9 in. long and weighs 3¾ lb. It will cut up to No. 18 gage in steel and up to No. 15 gage in aluminum. Vol. 84, p. 108.



PROTRACTOR—*Tru-Line Corp., 6022 Wilshire Blvd., Los Angeles, Calif.* Accurate layouts for any angle cut on round surfaces are possible with "Trumark Junior" protractor. Mark goes completely around shapes. Vol. 84, p. 1100.

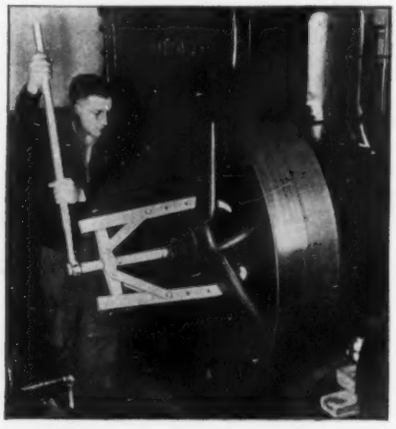
MASTER TYPE—*H. P. Preis Engraving Machine Co., 157 Summit St., Newark, N. J.* Intended for producing steel letter stamps, type, and various classes of dies, plastic master copy type (not shown) is for three-dimensional pantographic engraving and die-cutting machines. Type is furnished in three heights and eight widths. Vol. 84, p. 272.



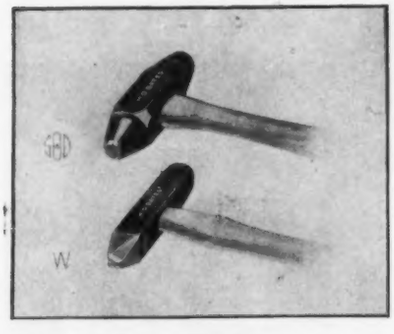
ANGLE-HEAD—*Stow Mfg. Co., Binghamton, N. Y.* A close-corner angle-head permits drilling and filing with flexible shaft machines. Over-all dimension from drill socket to top of case is only 2⅛ in., while that from spindle center to outside of case is but 9/16 in. Vol. 84, p. 640.

TOOLS and ACCESSORIES—Hand Tools

HACKSAW FRAMES—*Victor Saw Works, Inc., Middletown, N. Y.* Four hacksaw frames vary in design and have molded pistol-grip handles. They take blades 8 to 12 in. long and permit them to face four ways. Vol. 84, p. 112.

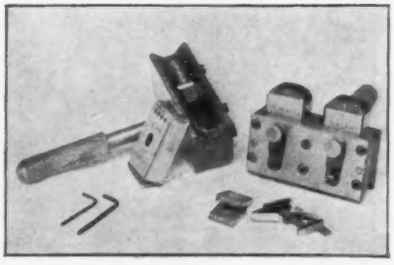


WHEEL PULLER—*Owatonna Tool Co., 353 Cedar St., Owatonna, Minn.* "Gripomatic" wheel puller incorporates a gripping feature claimed to prevent jaws from slipping off work. Tool has spread of 12 in. and pulling capacity of 70,000 lb. Vol. 84, p. 36.

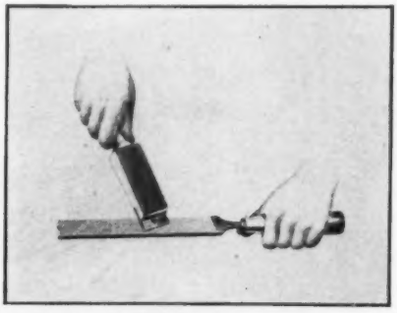


INSPECTORS' HAMMERS—*H. O. Bates, 245 N. Broad St., Elizabeth, N. J.* Styles B and C inspectors' marking hammers are of tool steel, machine engraved, hand finished and hardened and tempered. Vol. 84, p. 36.

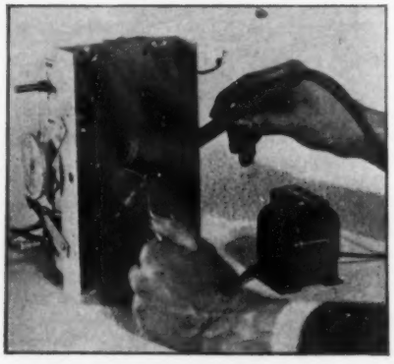
STAMPING MACHINE—*H. O. Bates (AcromarK Co.), 245 N. Broad St., Elizabeth, N. J.* "AcromarkeR" nameplate stamping machine stamps complete plates from metal strip and handles etched, embossed, cast and other types of metal, fiber or plastic plates. Holding fixture receives a plate up to 8x4¾x⅝ in., and permits stamping within an area of 5 in. left to right by 3¼ in. top to bottom. Vol. 84, p. 994.



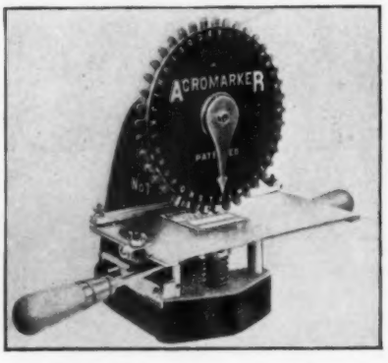
STAMPING SET—*New Method Steel Stamps, Inc., 143 Jos. Campau, Detroit, Mich.* Designed for optional use of solid or individual type stamps, this universal marking device permits marking directly on shafts and rods of practically any diameter. Vol. 84, p. 32.

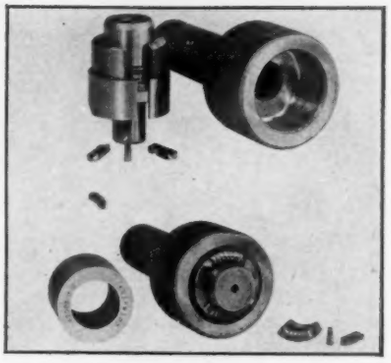


FILE CLEANER—*Cincinnati Tool Co., Norwood, Cincinnati, Ohio.* "Hargrave" No. 366 file cleaner with chip plow cleans files of soft metal chips, such as those produced when filing lead, copper, aluminum and soft steel. Vol. 84, p. 152.

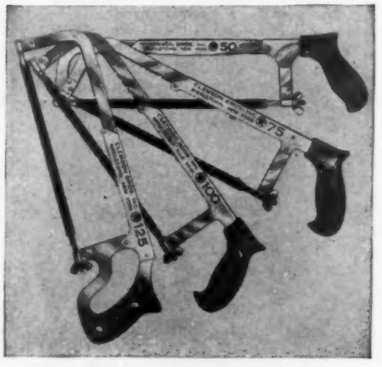


ELECTRIC SOLDERER—*Ideal Commutator Dresser Co., 1057 Park Ave., Sycamore, Ill.* Recommended for all types of light work, the "Instant Heat" electric solderer heats upon touching the wire to be soldered. Power consumption is 80 watts. Vol. 84, p. 184.





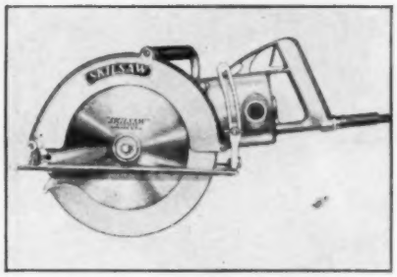
TYPE HOLDER—*New Method Steel Stamp Co., 143 Jos. Campau, Detroit, Mich.* Setscrews are eliminated in this type holder for marking such annular parts as gears, bushings and bearings in quantity production. Vol. 84, p. 395.



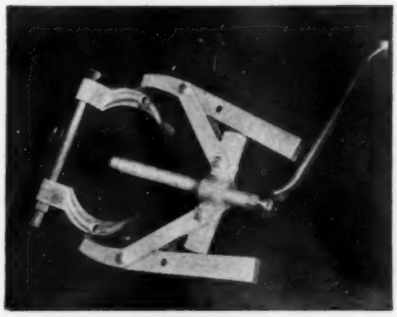
HACKSAW FRAMES—*Clemson Bros., Inc., Middletown, N. Y.* Four types of hacksaw frames are fitted with molded pistol-grip handles and are adjustable for blades from 8 to 12 in. long. Vol. 84, p. 34.

SOLDERING IRON—*Hexacon Electric Co., 161 W. Clay Ave., Roselle Park, N. J.* No. 700 electric soldering iron (not shown), is for extra-heavy soldering jobs. This 700-watt iron uses a 1¾ in. diameter screw-type tip. Vol. 84, p. 446.

SOLDERING IRONS—*Hexacon Electric Appliance Corp., 161 W. Clay Ave., Roselle Park, N. J.* Three additional soldering irons have 60, 120 and 170 watts capacity, with tips of ½, ⅝ and 1 in. diameter. They are built for constant-duty service. Vol. 84, p. 186.

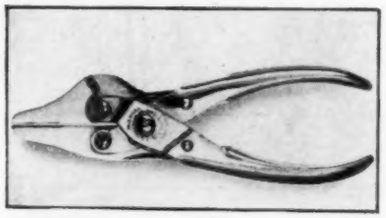


HAND SAW—*Skilsaw, Inc., 5033 Elston Ave., Chicago, Ill.* Improved Model 127 portable electric hand saw has a 12-in. blade and cuts to a depth of 4⅜ in. It is suitable for cutting copper sheets up to ⅝ in., lead sheets up to 2 in. thick and many types of heavy gage corrugated metals. Blade has a free speed of 2400 r.p.m. Vol. 84, p. 444.



PULLER ATTACHMENT—*Owatonna Tool Co., Owatonna, Minn.* A pulling attachment to remove multiple V-drive sheaves for use with "Gripomatic" pullers is applied at the V-groove base and pulling strain is distributed over a large area. Maximum capacity of the No. 680 attachment is 10 in. Vol. 84, p. 228.

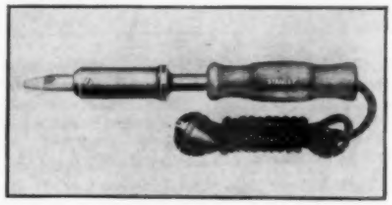
NUMBERING PLIERS—*H. O. Bates, 245 N. Broad St., Elizabeth, N. J.* The number wheel used on these pliers can be engraved with characters from 1/32 to ¼ in. high. Pliers are adjustable to a variety of diameters. Vol. 84, p. 186.



PLIERS—*William Schollhorn Co., 414 Chapel St., New Haven, Conn.* Improved No. 402 6-in. "Bernard" pliers have a 25 per cent greater jaw opening and longer tapering jaws. They retain such features as an open throat through which wire may be fed, compound leverage and outside cutting jaws. Vol. 84, p. 781.

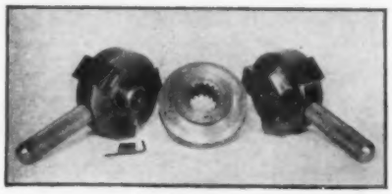
WRENCH SET—*Blackhawk Mfg. Co., 5025 W. Rogers St., Milwaukee, Wis.* "Nuggies" wrenches have a ¼-in. square drive. Socket sizes range from 3/16 in. to 7/16 in. Miniature combination open end and box type wrenches accompany socket wrenches in the 18ND set. Vol. 84, p. 641.

RATCHET SCREWDRIVERS—Four "Yankee" offset ratchet screwdrivers include assorted adapters for use with both slotted and hollow screws. No. 3400 screwdriver is 3 15/16 in. long and is furnished complete with three blades, two ratchet and one rigid. No. 3800 tool is of heavier construction, measures 4¾ in. long, and has two blades of different dimensions. No. 3600 unit is an offset ratchet handle for interchangeable adapters for smaller screws. No. 3900 screwdriver is an offset ratchet handle of heavier construction for larger screws. Vol. 84, p. 396.

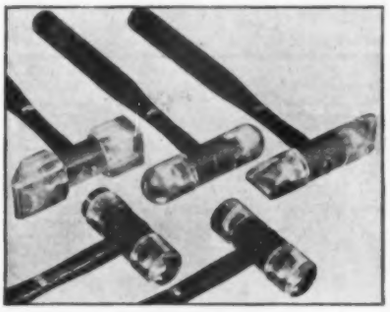


SOLDERING IRON—*Stanley Tools, Div. of The Stanley Works, New Britain, Conn.* These electric soldering irons are fitted with plug tips. Irons are made in four sizes, from 105 to 350 watts, with tip diameters from ⅜ to ⅞ in. Vol. 84, p. 152.

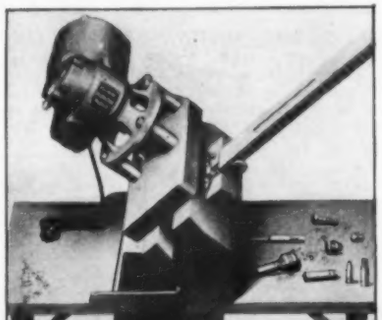
MARKING MACHINE—*H. O. Bates, (AcromarK Co.) 245 N. Broad St., Elizabeth, N. J.* Round, flat and tapered articles can be stamped with the No. 9 marking machine. Marking area is sufficient to take parts up to 10x4 in. For round pieces the product is rolled as a flat die impresses the mark. For flat parts the impressions are made with a roller die. Vol. 84, p. 1107.



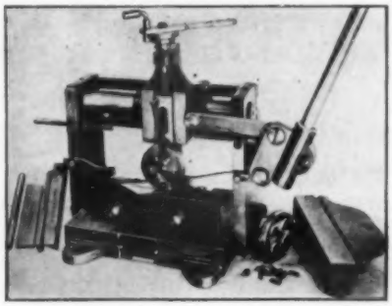
STAMPING TOOL—*New Method Steel Stamps, Inc., 143 Jos. Campau, Detroit, Mich.* To simplify production marking of parts having annular flat faces, such as gears, bushings and bearing races, this tool has a pilot guide in the holder to center the marking device. Type retainers are carried in T-slots. Holders may be used for either solid type block or individual type. Vol. 84, p. 34.



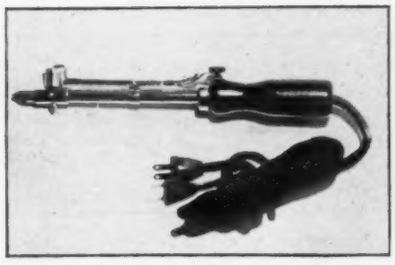
SOFT FACE HAMMERS—*Stanley Tools, New Britain, Conn.* An extensive line of soft face hammers will not mar finely finished surfaces. Removable tips are of "Stanloid," a tough, resilient, non-metallic substance. Vol. 84, p. 946.



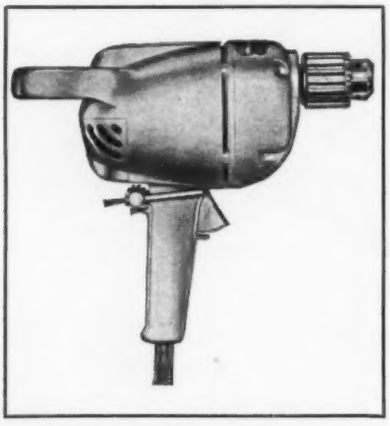
PRODUCTION MARKER—*Quality Die Co., 9311 Baltimore Ave., Chicago, Ill.* "Hoffman" production marking machine has been designed for high-speed marking of light or heavy formed metal parts. Production as high as 7,000 pieces per hour is possible without jamming, in marking such products as shells, carburetor jets, venturi tubes, spark-plug bodies, and other round tubular or solid parts. Operation is completely automatic. Vol. 84, p. 776.



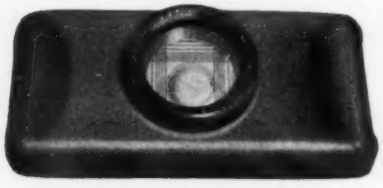
TOOLS and ACCESSORIES—Hand Tools



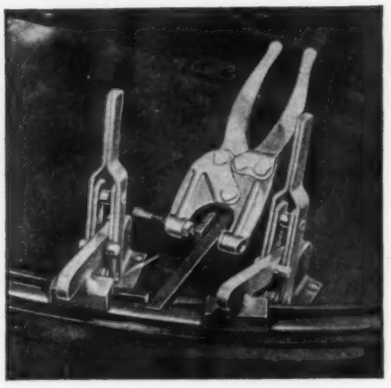
SOLDERING IRON—*Dural Remote Control, Inc., 31776 W. Warren St., Wayne, Mich.* "Solder Master" electric soldering tool allows the operator to have a free hand to hold or adjust parts. Solder is delivered a drop at a time by depressing a trigger. Size of drop is controlled by a button; spill-proof cup holds 48 drops. Length is 12 in.; weight is 11 oz. Vol. 84, p. 482.



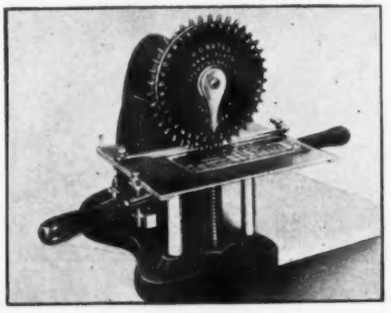
ELECTRIC DRILL—*Skilsaw, Inc., 5033 Elston Ave., Chicago, Ill.* Model No. 80 ½-in. electric drill weighs only 8 lb., is 11½ in. long, and measures 9¼ in. high. It develops a no-load speed of 450 r.p.m. and a full-load speed of 300 r.p.m. Vol. 84, p. 900.



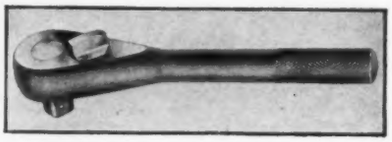
PRECISION LEVEL—*Wm. B. Fell Co., 700 South St., Rockford, Ill.* Only one setting is required when leveling equipment with this all-way precision level. Level, easily read to 0.00025 in., also shows 0.005 in. per ft. Graduations are in 0.0005 in. per ft. on the side of the ½-in. glass toward the bubble. Vol. 84, p. 896.



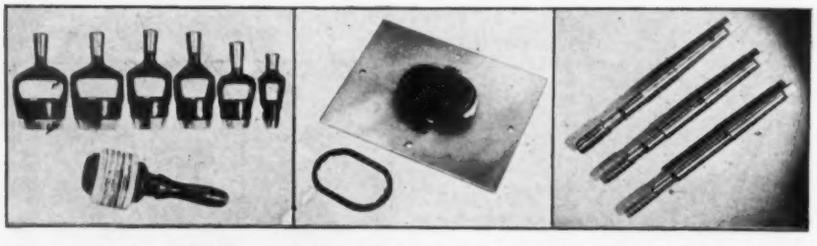
CLAMPS—*Detroit Stamping Co., 3427 W. Fort St., Detroit, Mich.* The rapid-action No. 220 "De-Sta-Co" toggle clamp, developed for the aircraft industry, measures only 1 29/32x1⅝ in. at the base and is designed for quick clamping, positive holding and instant release. Raising the operating handle delivers a pressure ratio of 33:1 to the clamping arm. Rapid-action No. 460 toggle pliers measure only 6 15/32 in. long over-all. Closing handles exerts a pressure ratio of 75:1. Vol. 84, p. 225.



STAMPING MACHINE—*H. O. Bates, 245 N. Broad St., Elizabeth, N. J.* No. 5 machine stamps name-plates, parts or pieces ranging from 0.005 in. to 3¼ in. thick, and up to 9x7½ in. in length and width. Nearly three tons pressure permits stamping stainless steel and other high-strength alloys. Vol. 84, p. 898.

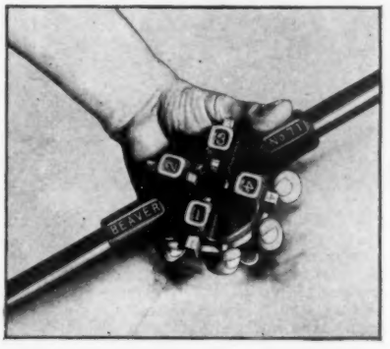


RATCHET WRENCH — *Armstrong Bros. Tool Co., 317-357 N. Francisco Ave., Chicago, Ill.* This miniature reversible ratchet for miniature detachable-head wrenches is 4 in. long and is made of chrome vanadium steel. Vol. 84, p. 32.

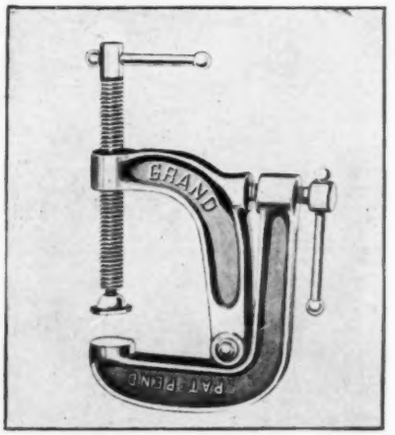


STEEL PUNCHES—*H. O. Bates, 245 N. Broad St., Elizabeth, N. J.* Hand-forged steel punches, for both hand and machine use, are available. At left are round hand forged punches and a rawhide mallet. In center are hand forged press punches to supplant steel rule dies. At right are high-speed rotary punches for cutting holes in rubber or other pliable materials. Vol. 84, p. 732.

SAFETY STAMP HOLDER—*M. E. Cunningham Co., 115-117 E. Carson St., Pittsburgh, Pa.* A double-floating box-type safety holder efficiently marks hot, cold, flat, round, or angular surfaces. Holder and type are made from patented steel which will not spall or mushroom. Vol. 84, p. 731.



THREADING TOOL—*Beaver Pipe Tools, Inc., Warren, Ohio.* Series 71 pipe and bolt threader handles pipe from ⅛ to ¾ in., right or left hand, and bolts from ¼ to 1 in., right or left hand, coarse or fine thread. Self-centering universal chuck requires no loose bushings. Vol. 84, p. 227.



PIVOTED CLAMP—*Grand Specialties Co., 3103 W. Grand Ave., Chicago, Ill.* This clamp incorporates the standard clamp principle with the additional vise feature which is said to provide positive grip to eliminate all surface movement of the clamp or material. It has extra slip-on jaws for pipes, rods and tubing. It is made in three sizes with openings of 3, 4 and 6 in. Vol. 84, p. 594.

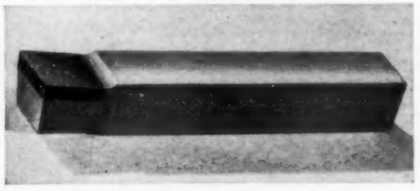
For Quicker Delivery, Maximum Economy Specify These *STANDARD* Carboloy Products

Carboloy Standard Tools For "Universal" Shop Use On 80% of All Turning, Facing, Boring Applications

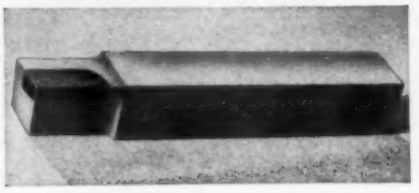
Designed for "universal" shop use on 80% of all turning, boring and facing jobs on steel, cast iron, brass, etc., the new Carboloy standard tools—announced September 3—comprise but five styles in three grades at a price well below previous comparable tools.

The basic design of these tools is such that numerous variations can be rapidly ground in the tools by the user to meet special requirements. With the fast, simple grinding procedure developed during the past five years and now widely used by industry, such tool changes can be rapidly and economically accomplished. This rapid grinding procedure, plus the fact that the price of these new standard tools is comparable to that of many ordinary tools, brings to the field of Carboloy tool use a flexibility that permits broad "universal" use of these tools within the average shop on short job-lot work as well as production runs.

The new standardized tools are carried in stock, ready for shipment, completely ground and ready for use. An extremely valuable feature is the incorporation of a ground-in chip breaker on all standard tools style for 7, 13 and 14, designed for the machining of steel, at no additional charge.



Style No. 1—Standard Tool for steel, cast iron, etc. Available in 9 Sizes

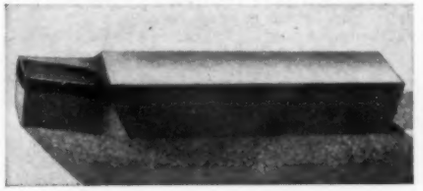


Style No. 4—Standard Tool for steel, cast iron, etc. Available in 9 sizes—left and right hand

In addition to the obvious economy possible these new standard tools offer the advantages of simplified ordering and elimination of the necessity for large, diversified tool stocks covering many grades and styles.

With each tool is packed a condensed pocket size instruction booklet giving feeds, speeds, chip-breaker data and grinding instructions.

Catalog GT-125 for prices and specifications.



Style No. 13—Standard Tool for steel, cast iron, etc. Available in 5 sizes, left and right hand

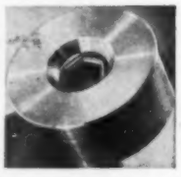
Standard Dies for Drawing Round Wire, Bar Tubing

Carboloy standard round hole dies for drawing wire bar and tubing are available in nibs R-1 to R-18 inclusive for sizes up to 3½" in diameter. Used for drawing low and high carbon steel and non-ferrous metals. Supplied in finished form ready for use or in cored form (semi-finished) for final finishing in your own die room. Catalog D-106. Complete die room equipment available for finishing and servicing work in your mill. Catalog D-103.

Carboloy standard round hole dies produce closer tolerances and a higher quality finish, two factors that not only provide economies on the original work but also result in substantial savings on subsequent processing operations such as machining, threading, etc., on the wire, bar and tubing.

In addition to this standard line, numerous special dies are available for sheet metal drawing and redrawing, bolt sizing, etc.

Standard Dies for Drawing Square and Hex Shapes



Carboloy standard dies for drawing square and hexagonal shapes are available in sizes up to 2" across flats, hexagonal, and 1¾" across flats square. Catalog D-107.

Until recently supplied only in finished form ready for use, these dies now are available in cored form (semi-finished) for rapid finishing to desired size in your own die room. Standard equipment for finishing and service work available. Catalog D-108.

Carboloy shape dies finish the material within close limits, with controlled corners, and frequently eliminate grinding and polishing operations.

In addition to the standard square and hex dies, any special shapes can be supplied.

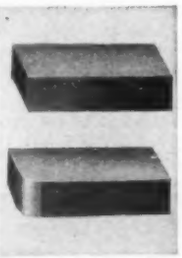
Carboloy Masonry Drills For Drilling Concrete, etc. 50% Faster

With new plants, plant expansions and alterations being rushed, Carboloy Masonry Drill-Points have become unusually valuable time savers. They drill holes in concrete, tile, porcelain, brick, slate, etc., 50%-75% faster than ordinary drills, or slow, hand chiseling methods. Provide unusual economy in the installation of new equipment, partitions, service lines, plumbing, etc. Drill clean, accurate holes, won't splinter fragile work and are quieter for occupied office work. Available in complete size range. Leaflet GT-103.

Carboloy Diamond Dressers For All Types Grinding Wheels

Available in standard sizes ¼", ⅜" and ⅜" diameter, Carboloy diamond dressers are stocked for immediate delivery in 5 commonly used holders and also in completed matrix form requiring mounting only in holder specified on your order. These dressers, containing a multitude of diamonds impregnated in a hard Carboloy matrix, require no remounting, stand unusual abuse, eliminate diamond loss and waste and are uniformly priced at $9.60, $12.60 and $15.35, including holder. Catalog DR-38.

Standard Carboloy Blanks In 2 Styles and 3 Grades



Standard Carboloy Blanks for mounting on your own shanks are stocked for prompt delivery in a wide range of sizes in the two styles illustrated. Especially low priced . . . for example, a blank for a ⅜" square tool bit costs 56c in lots of 1 and 22c in lots of 50 or more. Standard blanks are available in Grade 78-B for universal use on steel cutting and Grades 44-A and 883 for use on cast iron, brass, aluminum, non-metallics, etc. Catalog GT-126. Instructions provided for brazing blanks to your steel shanks.

CARBOLOY COMPANY, INC., DETROIT, MICH.

Chicago • Cleveland • Los Angeles • Newark • Philadelphia • Pittsburgh • Worcester, Mass.

The Mark of CARBOLOY

Look for this triangular trademark on tools you buy. Your assurance of genuine Carboloy cemented carbide.

CARBOLOY

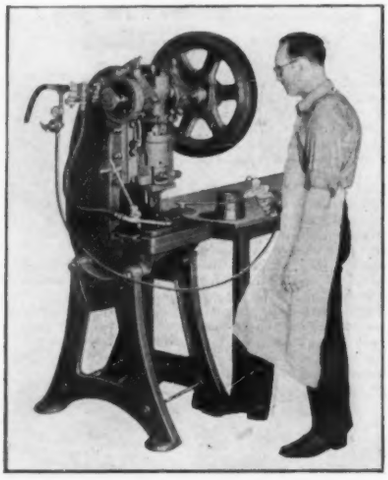
REG U S PAT OFF

TUNGSTEN CARBIDE
TANTALUM CARBIDE
TITANIUM CARBIDE

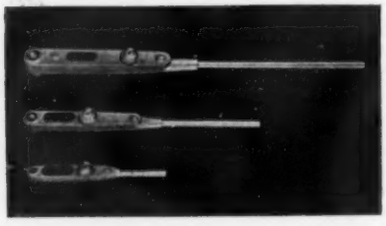
FOR CUTTING, DRAWING, SHAPING, EXTRUDING METALS AND NON-METALLICS ★ FOR REDUCING WEAR ON EQUIPMENT OR PRODUCTS YOU USE OR MAKE

TOOLS and ACCESSORIES—Hand Tools

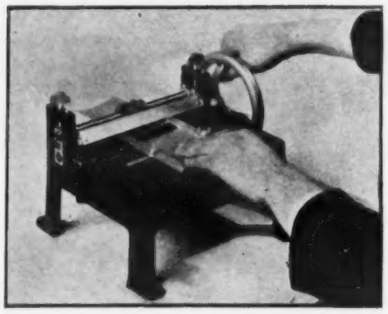
SOFT FACE HAMMERS—*Bonney Forge & Tool Works, Allentown, Pa.* Five more types of soft face hammers will not mar finely finished surfaces or delicate machine parts. They are also useful for forming and working light sheet metal. All tips are renewable. Head weights range from 1½ oz. to 2 lb. Vol. 84, p. 1102.



PRESS FEEDERS—*F. J. Littell Machine Co., 4163 Ravenswood Ave., Chicago, Ill.* "Press-Vac" safety feeder picks up flat-surface materials and feeds them into punch presses. It consists of a pistol-grip handle and a vacuum cup attached to an extension. It is attached to a compressed air line and requires a pressure of 20 to 45 lb. Vol. 84, p. 31.



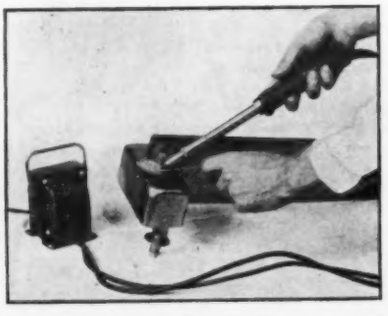
TORQUE INDICATORS—*Blackhawk Mfg. Co., 5025 W. Rogers St., Milwaukee, Wis.* Torque indicators having maximum capacities of 133, 175, 420 and 1000 ft.-lb. are available in two styles. For small assemblies, the 133 ft.-lb. "Torkflash" features a flashlight signal and pre-set tension. Larger models feature "Stay-Set" dial. Vol. 84, p. 522.



INSULATION FORMER—*Ideal Commutator Dresser Co., 1057 Park Ave., Sycamore, Ill.* Neat, uniform slot linings can be easily made with this insulation former. Either plain or cuffed insulation of any length up to 8 in. wide may be handled. Vol. 84, p. 897.

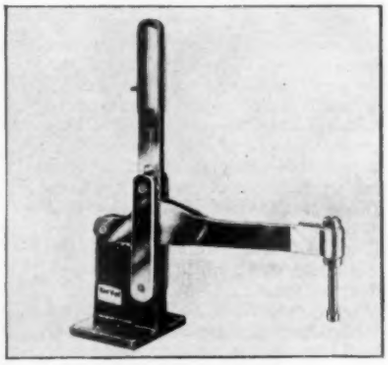
SOLDERING IRON TIPS—*Stanley Tools, New Britain, Conn.* Armor clad soldering tips have been developed for screw tip and plug tip electric soldering irons. Tip is of copper having a thin special metal coating. Vol. 84, p. 270.

MACHINISTS' TOOLS—*George Scherr Co., 128 Lafayette St., New York, N. Y.* "GS" machinists' tools (not shown) consist of a combination set with drop forged hardened square heads, hardened center head, hardened blade and reversible protractor head; a combination set with hardened blade and center head, protractor and square head of cast iron; 4, 6 and 8 in. dividers; 4, 6 and 8 in. inside and outside spring calipers; hardened and tempered center gages, thickness gages, depth gages, surface gages and magnifiers. Hook, sliding caliper, flexible and narrow tempered rules are included. Vol. 84, p. 51.

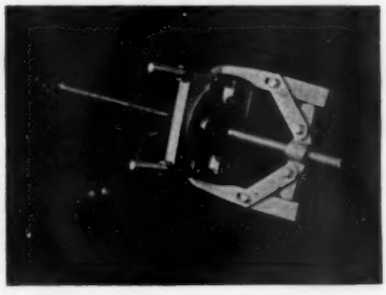


SOLDERING IRON—*Ideal Commutator Dresser Co., 1057 Park Ave., Sycamore, Ill.* Soldering temperature in less than a minute is claimed for the "Quick Heat" soldering iron. Element contacts tip point for fast heating. Tool is recommended for all ordinary soldering. Transformer is rated at 500 watts, 110–6 volts, 50–60 cycles. Vol. 84, p. 482.

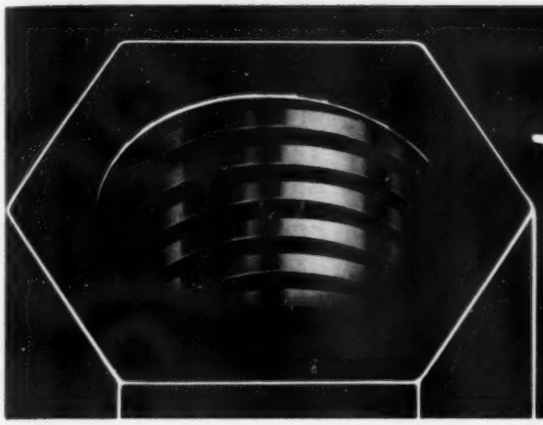
TUBE BENDERS—*Greenlee Tool Co., Div. of Greenlee Bros. & Co., 12th St. & Columbia Ave., Rockford, Ill.* Hand-operated steel tube benders permit bending all kinds of tubes without kinking or flattening. Six sizes are available for tubes having outside diameters of ¼, 5/16, ⅜, ½, ⅝, and ¾ in. Vol. 84, p. 640.



TOGGLE CLAMP—*Knu-Vise, Inc., 16841 Hamilton Ave., Detroit, Mich.* "Knu-Kam-Klamp" cam-action toggle clamp holds more than one thickness of stock at one set-up. Adjustment range is from ⅞ to 1 in. Clamp is made in two sizes, interchangeable with the standard Type 110 and 250 toggle clamps. Vol. 84, p. 641.



PULLER ATTACHMENT—*Owatonna Tool Co., 353 Cedar St., Owatonna, Minn.* OTC pulling attachments with "Gripomatic" pullers are available in four sizes, from 2¼ in. to 19¼ in. They help remove gears, bearings, bushings, pinions and other parts which are flush against housings. Vol. 84, p. 354.



WINTER TAPS

» FOR EVERY 1941 NEED «

When tapping is done by WINTER TAPS, you can be sure the threads are being produced to the most exacting specifications.

Winter Taps will help you keep up with your 1941 production schedules and at the same time make it easier for you to maintain high quality standards.

There's a Winter Tap for every tapping job—from the smallest machine screw sizes for fine instrument production up to the largest sizes for big, heavy work. With a complete range of sizes and styles from which to choose, it's a simple matter to standardize on WINTER—and save money.

Get all details TODAY! Write for a copy of 144-page Catalog No. 18, containing valuable data on taps, dies and thread cutting. Sent FREE on request.

QUALITY TAPS

THE WINTER BROTHERS CO.

MAIN FACTORY: WRENTHAM, MASS.
BRANCH FACTORY: DETROIT, MICH.

THIS VARIETY

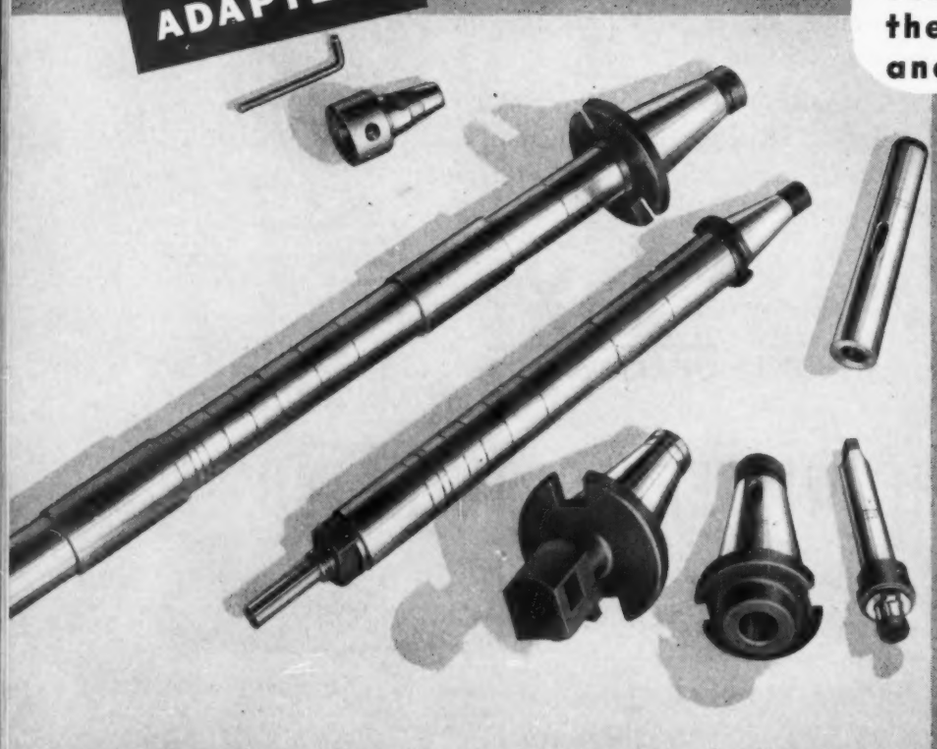
MEETS TODAY'S VITAL

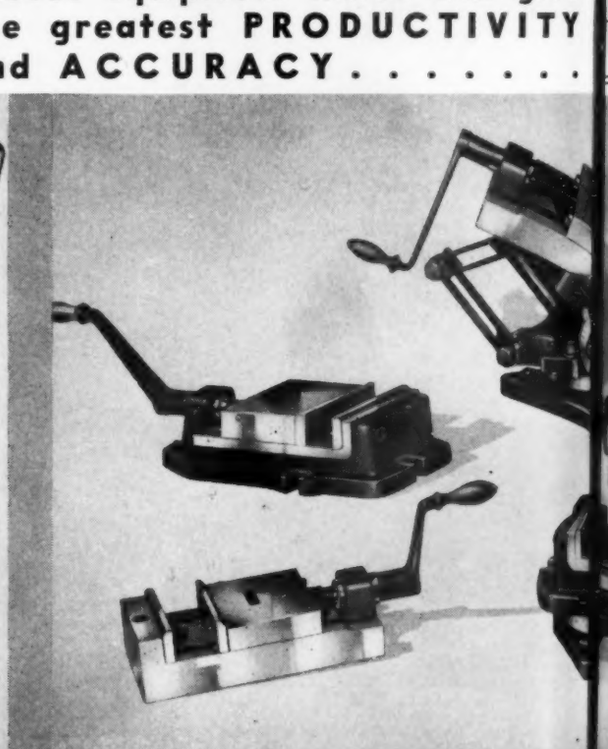
MACHINISTS' TOOLS

CUTTERS

ARBORS and ADAPTERS

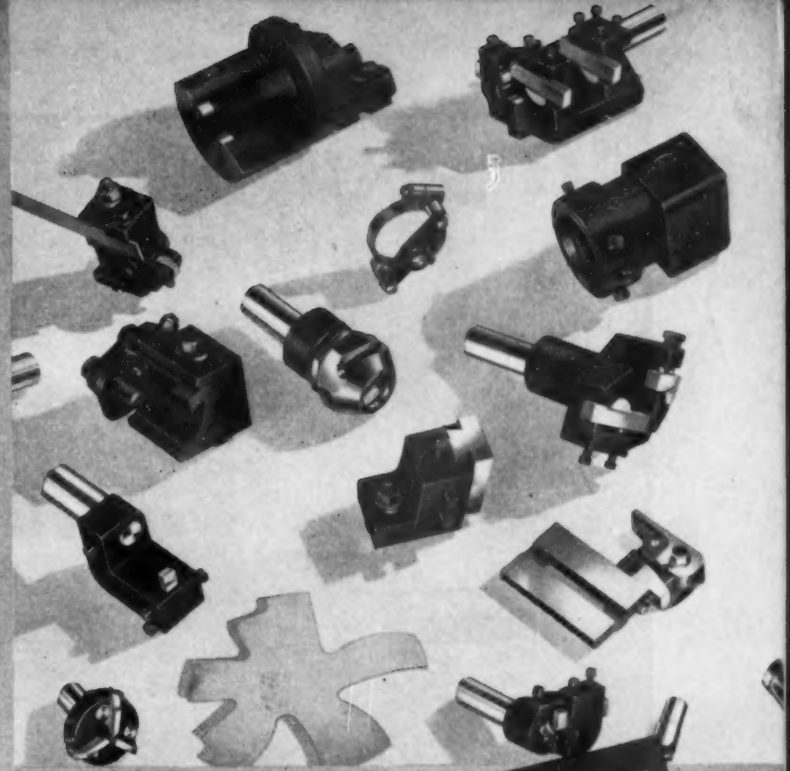
—In expanding your capacity, choose equipment which will give the greatest PRODUCTIVITY and ACCURACY . . . . . .





BROWN &

Y of EQUIPMENT
AL NEEDS PROFITABLY

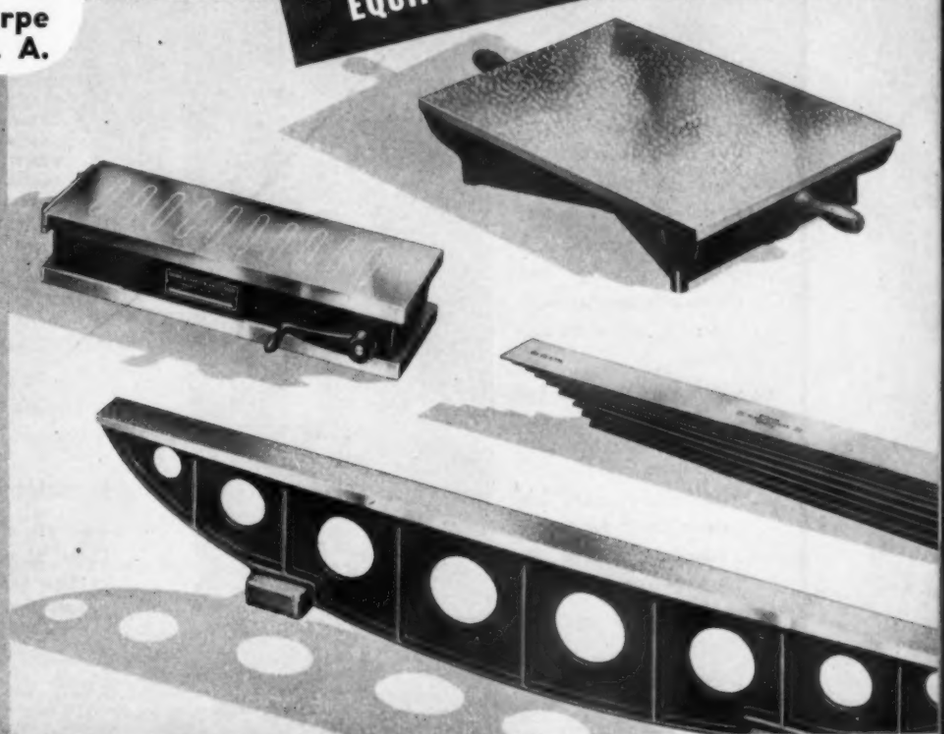


PUMPS

SCREW MACHINE TOOLS

OTHER USEFUL EQUIPMENT

VISES



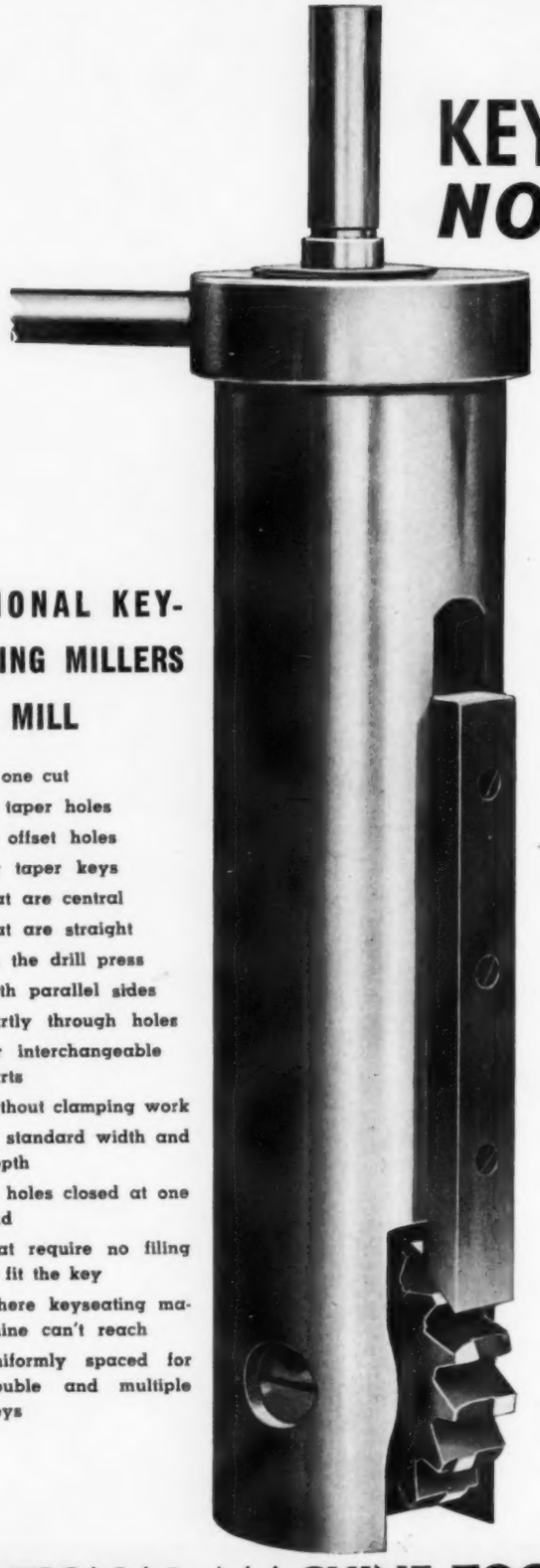
. . . . . SPECIFY
BROWN & SHARPE

B·S Catalog on request—Brown & Sharpe Mfg. Co., Providence, R. I., U. S. A.

G SHARPE

10 SOUND REASONS *why it will pay you to investigate*

NATIONAL KEYSEATING MILLERS *NOW . . .*



NATIONAL KEYSEATING MILLERS WILL MILL

. . . in one cut
. . . in taper holes
. . . in offset holes
. . . for taper keys
. . . that are central
. . . that are straight
. . . on the drill press
. . . with parallel sides
. . . partly through holes
. . . for interchangeable parts
. . . without clamping work
. . . of standard width and depth
. . . in holes closed at one end
. . . that require no filing to fit the key
. . . where keyseating machine can't reach
. . . uniformly spaced for double and multiple keys

1. By putting these simple, sturdy tools on your drilling machines, horizontal boring mills or radial drilling machines, you can save time and money on jobs that are not suitable for handling on keyseating machines and you can be assured of low cost, dependable keyseats with parallel sides, accurate depth and in perfect alignment with the axis of the bore.
2. National Keyseating Millers are big time savers. The tool goes through the hole *once only* and the keyseat is milled.
3. You can use these tools for milling keyseats in taper holes by the use of a special eccentric bushing in conjunction with standard keyseating millers.
4. Taper Keyseats can be milled in straight holes by the use of a special eccentric bushing used in connection with the miller.
5. Keyways in through holes, partly through holes, offset holes and holes that are closed at one end can be quickly and accurately milled with the "National."
6. Keyseating of all kinds is handled without clamping the work.
7. Clean, accurate work is assured without requiring filing for fitting keys.
8. National Keyseating Millers are available also for producing double or multiple keyseats that are accurately and uniformly spaced.
9. These units are economical in tool cost because each size will handle from two to four different widths of cutters. One size tool can be adapted to the keyseating of many different diameters by the use of eccentric bushings to meet diameters larger than that of the tool itself.
10. National Keyseating Millers are made in 26 different stock sizes for hole diameters from $\frac{1}{2}$ inch to $3\frac{1}{2}$" inclusive and can be used in the most sensitive drill press or the largest radial.

Investigate NOW!

Get *all* the valuable facts about this cost cutting tool. Send for catalog today.

NATIONAL MACHINE TOOL CO., CINCINNATI, OHIO

These Transmission Shafts are Well-Oiled— Thanks to CLE-FORGE!

Customers Say..

"CLE-FORGE HIGH SPEED DRILLS PRODUCE MOST HOLES PER GRIND, MOST GRINDS PER DRILL"

The "Cleveland" Drills on this unusual operation are *special*—but the work they are doing is *standard* and *uniform*.

The drilled part is a transmission shaft—a normalized molybdenum steel forging, center-drilled for an oil hole $20\frac{13}{16}''$ x $\frac{1}{2}''$. The manufacturer is getting real production—one shaft every 12 minutes.

And so can *you* get production with "Cleveland" Drills and "Peerless" Reamers—no matter what material you are working, what type of machines you use, how many holes you drill at once, how slow or fast the job —so long as it's *practical*.

And probably you can *save money* with "Cleveland" Drills and Reamers, just as thousands of other users do. Describe your work, and we will send copies of impartial tests on similar operations in which "Cleveland" Tools have proved superior on identical operations lasting for months or years.

Experienced "Cleveland" representatives will arrange tests in your plant, or help you to find ways of reducing your drilling costs.

Address any "Cleveland" Stockroom or your usual source of supply.

We favor adequate Preparedness for National Defense

The CLEVELAND TWIST DRILL COMPANY
1242 EAST 49th STREET
CLEVELAND

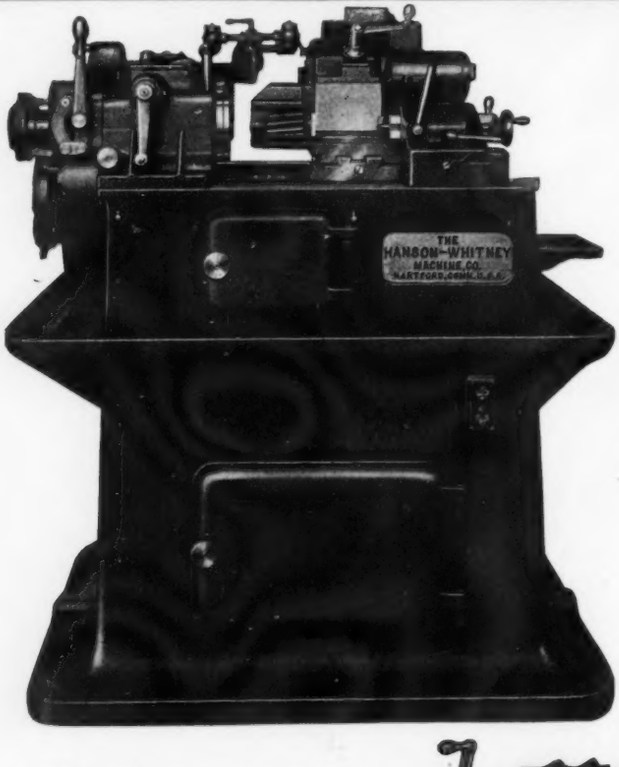
TRADE MARK REG. U. S. PAT. OFF. AND FOREIGN COUNTRIES

30 READE ST. NEW YORK · 9 NORTH JEFFERSON ST. CHICAGO · 650 HOWARD ST. SAN FRANCISCO
6515 SECOND BLVD., DETROIT · LONDON - E. P. BARRUS, LTD.- 35-36-37 UPPER THAMES ST., E.C.4

"CLEVELAND" DISTRIBUTORS EVERYWHERE ARE READY TO SERVE YOU

YOU CAN DEPEND ON . . .

TO PUT ACCURATE THREAD MILLING . . . . .



WITH H-W THREAD MILLERS

Modern in every detail, Hanson-Whitney Thread Millers provide every facility and convenience for low cost, accurate work. They can be depended on for the economical milling of perfect threads on a production basis. The possibility of spoiled work is eliminated. In many cases the "Milling Process" is the only satisfactory solution to the problem of threading difficult materials.

On H-W machines, threads are completed in one revolution of the work through the use of a thread milling hob. These machines are equally well suited to the production of external or internal threads, right or left hand.

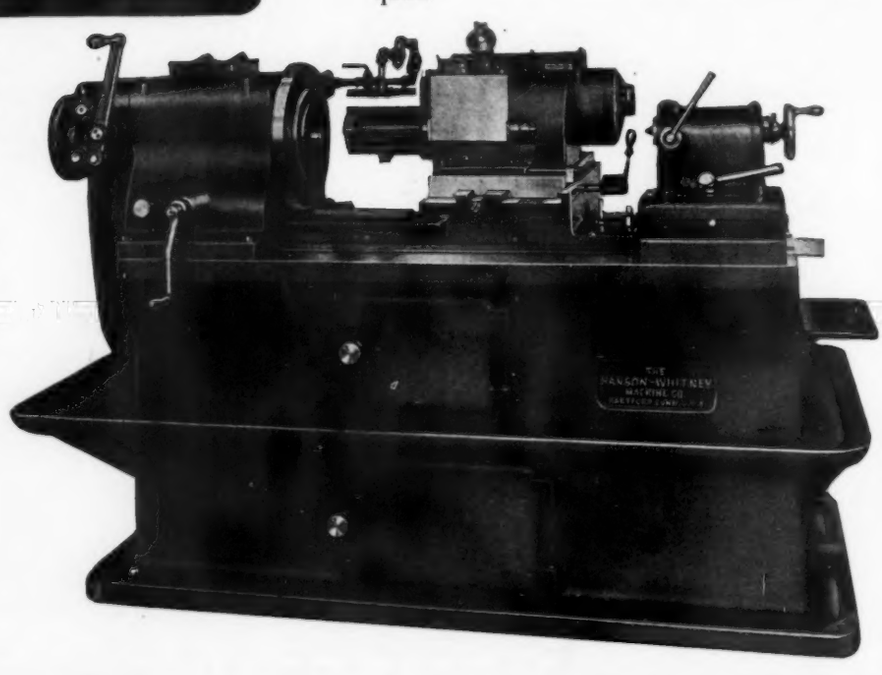
These machines are semi-automatic in operation. All functions with the exception of loading are automatic. Set up requirements are simple and require but a few minutes.

Full and complete details are available on request.

H-W Universal Semi-Automatic Thread Milling Machine—4x9 inch. External capacity 4" diameter; internal capacity from ¾" to 4" diameter.

•

10x24 inch H-W Universal Semi-Automatic Thread Milling Machine. External capacity 10" diameter; internal capacity from 1" to 10" diameter.



The HANSON-WHITNEY MACHINE CO. . . .

. . . HANSON-WHITNEY

AND TAPPING ON A TRULY PRODUCTION BASIS

WITH "HANSON-PROCESS" TAPS

The sharp, clean cutting edges of "HANSON-PROCESS" TAPS—clearly seen and felt by close examination—are attained by manufacturing processes developed especially to achieve finer quality, keener cutting and greater accuracy.

Not only is every manufacturing operation closely controlled but final finishing is done *after hardening*. As a result H-W Taps are correct in lead, angle and diameter and maintain this precision under long, hard service. More and better tapped holes between grinds can be depended on with "Hanson-Process" Taps.

It's a simple matter to prove the speed and economy of H-W Taps. Put them to work on difficult jobs. Try them out on high-production tapping. Keep a record of their performance in number of tapped holes produced and in quality of threads tapped. Your study of comparative results will satisfy you that H-W Taps cut faster, more accurately and at lower cost per tapped hole. These superior results will lead you to the important conclusion that by standardizing on H-W Taps you will save both time and money on your tapping operations.

Domestic Representatives

MACHINERY and SMALL TOOLS—New York, L. C. Biglow & Co., Inc.; Rochester, A. G. Brice; Pittsburgh, William K. Stamets; Detroit: Nelson Shertburne, Jr.; Los Angeles, A. C. Behringer; St. Louis, Mo., W. H. Scheer.
MACHINERY ONLY—Philadelphia, Lloyd & Arms, Inc.; Cleveland, William K. Stamets; Chicago, Marshall & Huschart Machinery Co.; Cincinnati, Seifreat-Etstad Machinery Co.; Dayton, Seifreat-Etstad Machinery Co.
SMALL TOOLS ONLY—Philadelphia, General Tool Sales Co.; Cleveland, George A. Whalon; Chicago, M. Ray Pearce; Minneapolis, E. Willard Pennington; Dayton, George Langen, Jr.; Cincinnati, George Langen, Jr.

. . . HARTFORD, CONNECTICUT

Swiss Pattern Files

ONLY THE BEST ARE GOOD ENOUGH — FILES — TOOLS

Made in U.S.A.

Look For This Trademark On Every Tang

For the most delicate or accurate filing jobs

Cut Nos. 00-0-1-2-3-4-6
Sizes 3 in. to 12 in.

Whatever your precision filing jobs may be, you are sure to find a suitable selection in the large "American Swiss" assortment of more than 3000 different shapes, cuts, and sizes of Swiss-Pattern files. These precision tools are made by long-experienced, skilled specialists in a plant devoted exclusively to their manufacture.

Every manufacturing process is controlled to close tolerances, and each file is individually inspected before packing.

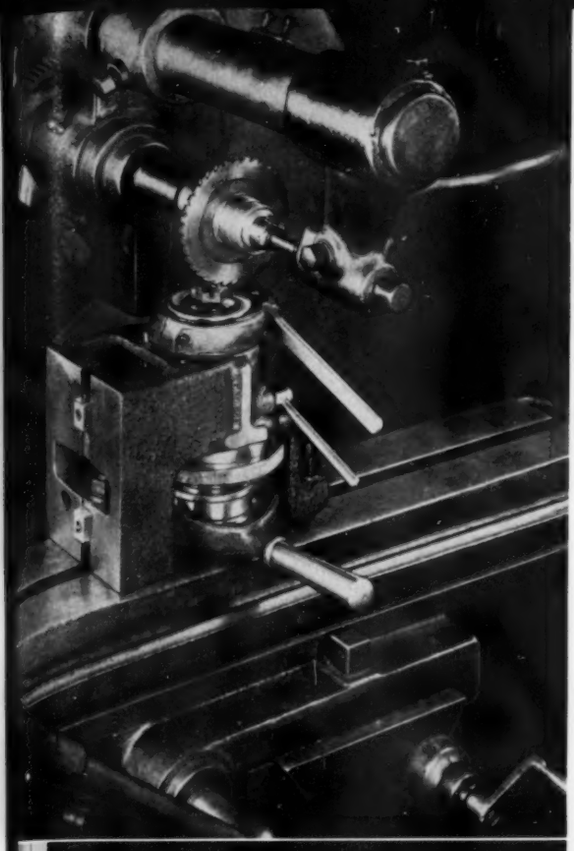
Buy from our Distributor

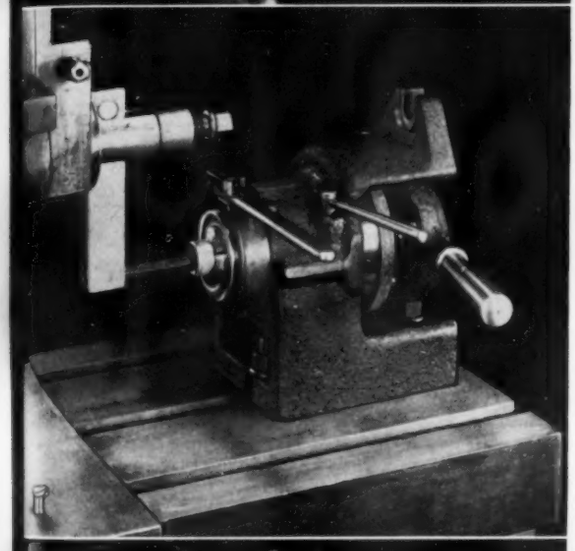
American Swiss File & Tool Co. ..... Elizabeth, N. J.

Also Manufacturers of Mechanics' Tools and Knurls

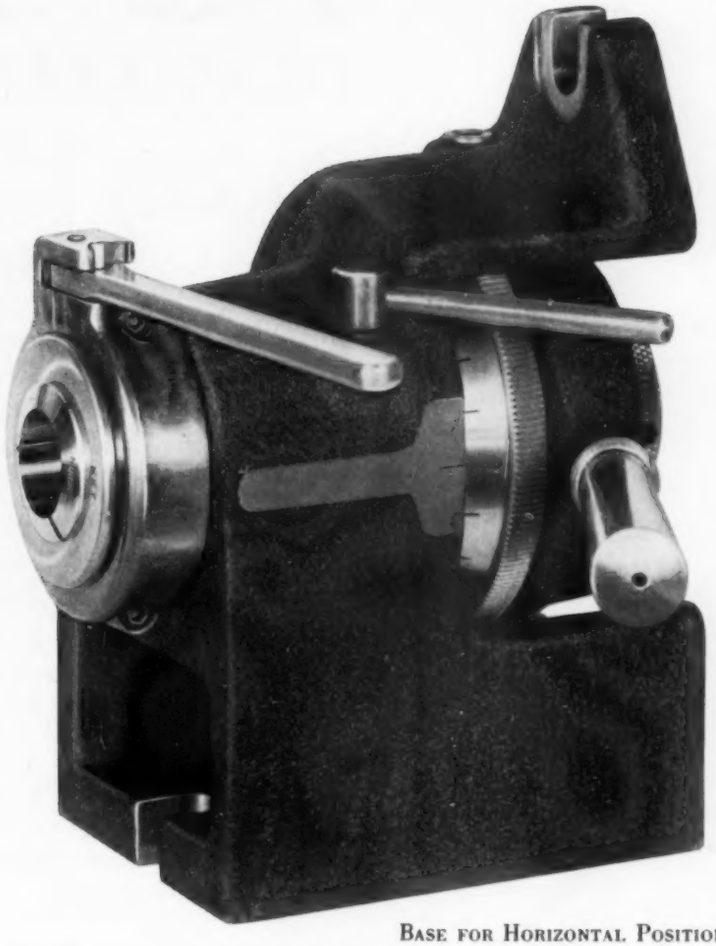
American Swiss

Files of Precision





NEW or OLD MACHINES CAN PRODUCE MORE . . .



BASE FOR VERTICAL POSITION

BASE FOR HORIZONTAL POSITION

WITH THE

HARDINGE HORIZONTAL-VERTICAL COLLET INDEX FIXTURE

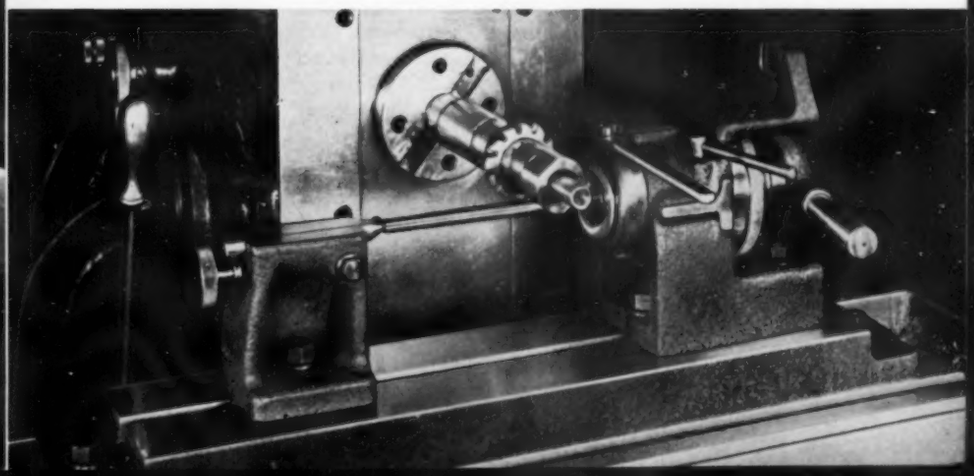
Readily adaptable to any milling, grinding, drilling or shaping machine for producing work required to be held in a collet and indexed 2, 3, 4, 6, 8, 12 or 24 divisions. Takes standard 5C HARDINGE Collets with range from 1/16" to 1" round. Index plate on spindle has a preselecting screw in each of the 24 index holes, permitting the exclusion of all index holes except those needed for the particular application—the operator cannot make a mistake when indexing! A ratchet device is provided for rapidly rotating the spindle when indexing. Lever for quick opening and closing of collet has 100 to 1 leverage.

Specifications: Overall height 8", overall length 6-½", bottom of base to center of spindle 4.000". Also supplied with sub-base and tailstock to increase the serviceability.

ASK FOR DESCRIPTIVE BULLETIN

HARDINGE BROTHERS, Inc.

ELMIRA, NEW YORK



TOOLS
THAT KEEP AHEAD
of the Demand for Increased Production

NO. 1 PROFILE GRINDER
A sturdy Bench Machine for grinding and fitting uneven contours and irregular shapes. Pays for itself in time saved on dies, punches, cams, templates and grinding to scribed lines.

High spindle speed—approximately—20,000 R. P. M. permits use of small wheels in confined openings.

INCREASED production commences in the toolroom, and it is from the toolroom that New Modern Machines project their greater efficiency throughout the whole production system.

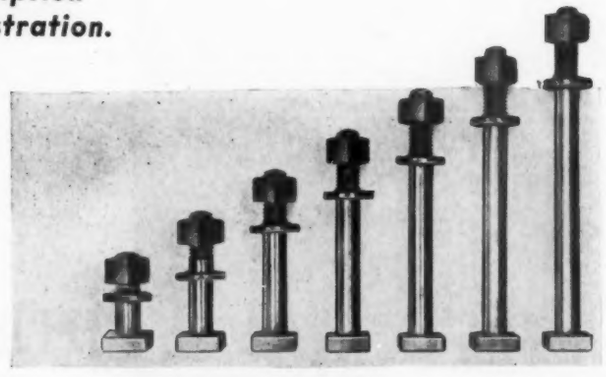
Boyar-Schultz Tools for the toolroom were developed to save time in performing many of the intricate tasks that the Tool and Diemaker has in the past, done by hand.

These Tools lend new skill to the expert mechanic and assist the less experienced worker to do higher quality of work.

Write for Full Description and Demonstration.

NO. 2 PROFILE GRINDER
A heavy duty Floor Model . . . a large companion to the Bench Model. Uses wheels from ½" in diameter up.

COPPERHEAD LAPS Copperhead Laps are standard in hundreds of shops throughout the country and abroad because users have found that it costs less to buy them than to make their own. There is nothing to wear out but the copper sleeve.

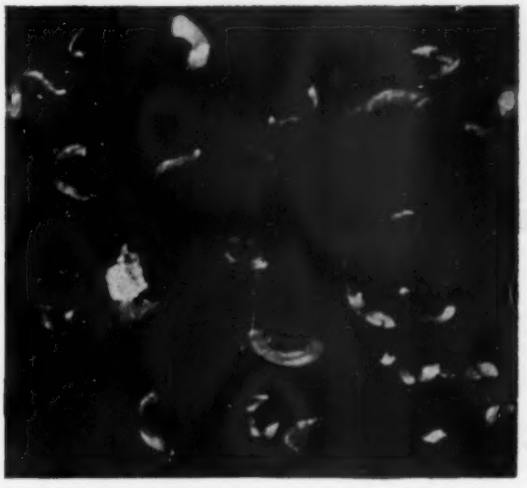


SMB BOLTS Making your own machine bolts for machine tools *would save the beds of those machines*—but the cost would be much higher than you would pay for accurately machined, heat treated Chromium Molybdenum steel SMB Bolts.

BOYAR-SCHULTZ CORPORATION
2109 WALNUT STREET
CHICAGO, ILL.

Make the "Chips Test"—and you'll specify DISSTON BITE-RITE FILES

THESE LONG, CURLING CHIPS cut by a Disston Bite-Rite File prove that more metal is taken off with each stroke. Hence, fewer strokes and faster filing.



UNEVEN FRAGMENTS removed by an ordinary file indicate slower filing, and not as smooth a filed surface.

If you want to cut filing costs and speed up production in your plant, try this simple test. Take a few strokes with a Disston Bite-Rite File on a metal specimen, and save the chips. Now repeat this operation, using an ordinary file. Compare the two sets of chips.

Notice how the majority of the chips cut by the Disston Bite-Rite File are heavy, long and curling—like chips from a lathe tool. Contrast them with the greater percentage of short, light, uneven fragments cut by the ordinary file.

These chips show how you can make important savings. Disston Bite-Rite Files take off more metal with each stroke, so that fewer strokes are required. This *faster filing* saves your workmen minutes that add up to dollars of profit.

And Disston Bite-Rite Files, with their staggered teeth and self-cleaning gullets, produce smoother filed surfaces. Files last longer, too, because the teeth are designed to cut—not scrape.

Ask your distributor to supply you with Disston Bite-Rite Files for the "Chips Test." Convince yourself—as many others have—that you can get better, speedier production, lower costs and increased profits by using Bite-Rite Files. Henry Disston & Sons, Inc., Philadelphia, Pa.

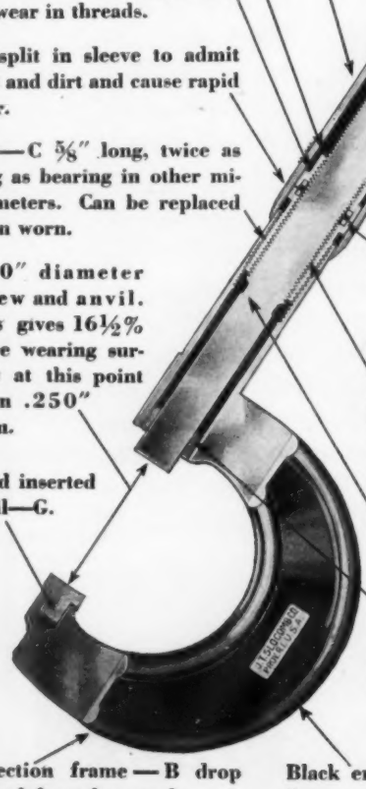
THERE'S A DISSTON BITE-RITE FILE FOR EVERY JOB. Your distributor can supply you with Disston Bite-Rite Files in practically every shape needed for machine shop service and in three different cuts: *Smooth Cut,* the finest; *Second Cut,* the next finest; and *Bastard,* coarse cut. Mill Files are also available in these three cuts and a fourth, *Mill Fine Bastard Cut.* Ask your mill supply house to help you select the right files for each job from the complete line of Disston Bite-Rite Files.

DISSTON HAS THE EDGE

DISSTON BITE-RITE FILES

Recognized . . . THE WORLD OVER AS

MODERN FEATURES OF SLOCOMB MICROMETER CALIPERS



Arrangement of nuts insuring long bearing in spite of wear.

Short nut—D to compensate for wear in threads.

No split in sleeve to admit dust and dirt and cause rapid wear.

Nut—C 5/8" long, twice as long as bearing in other micrometers. Can be replaced when worn.

.270" diameter screw and anvil. This gives 16½% more wearing surface at this point than .250" diam.

Solid inserted anvil—G.

I section frame—B drop forged from bar steel.

Decimal equivalents stamped on thimble.

F—Thimble.

Nickel silver spring E. Gives uniform tension on screw.

Adjusting nut—C to overcome wear on anvil or screw. Replaceable, giving entirely new bearing for screw.

One piece hard tool steel screw—A.

Accurately fitting bushing—H insures close fit for screw. Replaceable.

Black enameled or polished frame.

SLOCOMB MICROMETER SETS Nos. 22 and 28

Set #22 is made up of 12 micrometers and 11 end measures which will measure work from 0—12", by .001; or furnished, when desired, to measure from 0—300 mm. by 1/100 mm. Set #28 (not shown) consists of 12 micrometers and 11 end measures measuring from 12"-24" by .001; or supplied, when desired, to measure from 300-600 mm. by 1/100 mm.

Other standard micrometers furnished to measure from 24"-60" or 600 m/m—1500 m/m.

SLOCOMB MICROMETER CALIPER No. 22

Measures all sizes from 0 to ½ inch by thousandths. Available with plain or friction stop. Light in weight and convenient to carry. Weighs only 1¾ oz.—a small, sturdy instrument of high accuracy. Made also in metric graduations.

ER AS THE STANDARD . . .

SLOCOMB

. . . by which modern precision measuring is judged . . .

Up-to-date methods of checking tolerances to high degrees of precision are as much a part of modernization programs as the use of modern, high production, accurate machines. Only instruments that can be depended on for super-accuracy in long, hard service can meet the rigid requirements of the modern shop with its demands for inspection to closer and closer limits.

Slocomb Micrometer Calipers have been time tested for half a century in shops the world over —in tool rooms—on production lines. The word "micrometer" invariably suggests the name "Slocomb"—an association of ideas that has made Slocomb instruments a standard of comparison in precision measuring.

SLOCOMB SNAP GAUGE MICROMETERS

Time savers which eliminate guesswork in inspection or production. The necessity for handling a wide variety of snap gauges is avoided by the use of these instruments. Work can be gauged as it progresses. Made in sizes from 0-1" to 11"-12"; metric graduations available from 0-25 mm. to 275-300 mm.

SLOCOMB CENTER DRILLS

These tools are available in either carbon or high speed steel in Center Drill, Combination Center Drill and Bell Type Center Drill types. Sizes: Center Drills from ⅛ to 1"; Combination and Bell type from ⅛ to ¾".

SEND FOR THE COMPLETE 112-PAGE SLOCOMB CATALOG

Ask for catalog No. 18 giving full detailed information on the complete SLOCOMB line—sent FREE to any machinist, inspector or shop man. No obligation is incurred in sending for this valuable handbook on modern methods of checking close tolerances.

Branch Offices: 125 Barclay Street, New York City • 3346 Superior Avenue, Cleveland, Ohio • 4484 Cass Avenue, Detroit, Mich. • 564 W. Randolph St., Chicago, Ill. • 121 Second Street, San Francisco, Calif. • 524 E. Fourth Street, Los Angeles, Calif. • 274 Croly Street, Syracuse, N. Y. • 1600 Sheridan Avenue, Pittsburgh, Pa. • 1600 Arch Street, Philadelphia, Pa. • 2217 East 24th Avenue, Denver, Colo.
Canada: Arthur Jackson Machine Tool Co., Montreal—Toronto.
Great Britain: Chas. Churchill & Co. Ltd., London, England • Buck & Hickman Ltd., London, England.
Japan: Dodge & Seymour Ltd., Australia, New Zealand • China • Japan • India.

J.T. SLOCOMB CO. PROVIDENCE RHODE ISLAND

SENSATIONAL NEW DEVELOPMENT PROLONGS LIFE OF ELECTRIC TOOLS

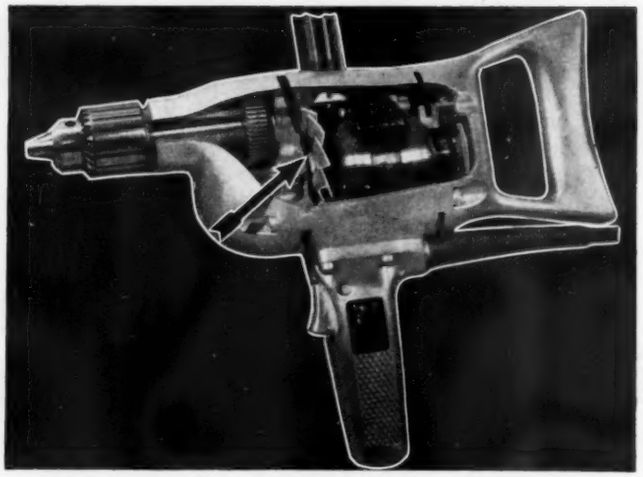
Black & Decker Introduces New Aluminum Alloy Motor Ventilating Fan that Reduces Vibration, is 66⅔% Lighter

An entirely new type of ventilating fan, considered one of the most important advancements in the portable electric tool field in recent years, has just been perfected by Black & Decker engineers, working in conjunction with metallurgists of the Aluminum Company of America. This improved fan minimizes vibration, weighs 66⅔% less, reduces bearing wear and cuts need for servicing to the very minimum.

While the user seldom sees it, the *ventilating fan* is one of the most vital parts of a portable electric tool. Not only is its perfect functioning essential to cool, efficient motor performance; it must have the tensile strength to withstand the stress of speeds as high as 15,000 R. P. M. and the operating shocks of nut runners, hammers and sanders; and it must be as nearly balanced as possible to avoid vibration that will cause excessive bearing wear and eventual tool failure.

Fans now in use on most portable electric tools (including Black & Decker) are stamped from cold-rolled steel, flame welded to a steel hub. Irregularities in stock and in welding, magnified by the high operating speed, set up injurious vibrations and subject fan to terrific stress.

The above illustration shows assembly of the new type fans. Stamped from soft aluminum alloy, the fan (A) is placed on an aluminum hub (B). Between the two is a washer-like ring (C) made of special alloy with a lower fusing temperature. All three are then fused into one single inseparable unit, later hardened by heat-treating. An important step in this process, is a remarkably new method of furnace brazing, developed in the Aluminum Company of America laboratories.



Arrow above points to the new aluminum alloy ventilating fan on Black & Decker ½" Junior Drill—one of the first Black & Decker Electric Drills being equipped with this lighter and sturdier fan that reduces vibration, has longer life.

• • •

Black & Decker's new fans overcome this condition two ways. First, the aluminum alloy fans weigh only one-third as much as the steel ones—which lessens the force of any vibration which would be set up by an off-balance fan. Second, a perfected *assemblying method* insures an accurately balanced fan which further minimizes vibration.

Now, added to Black & Decker's other traditional features of power and speed, comes this amazing aluminum alloy ventilating fan—which means that Black & Decker Portable Electric Tools will be lighter, operate smoother, require less servicing and will last even longer than their already famous predecessors. Although available now only on B & D Drills, the entire line will be equipped with the new alloy fans quickly as production permits. Phone your jobber to demonstrate BLACK & DECKER Drills in the model and size you need, or write: The Black & Decker Mfg. Co., 716 Pennsylvania Avenue, Towson, Maryland.

LEADING DISTRIBUTORS EVERYWHERE SELL

Black & Decker

PORTABLE ELECTRIC TOOLS

KEEP AHEAD OF SCHEDULES
With Tools that Hang Up Records!

Balance out your metal working equipment with these modern tools!

Don't expect even the most modern metal working machine to hold today's pace if handicapped by old-fashioned solid milling cutters and single-point tools. It's like giving a trained soldier a flint lock musket!

Forward-looking manufacturers are rapidly tooling up their machines with the improved O K Inserted-Blade Cutters shown here . . . refusing to sacrifice badly needed production to unbalanced equipment.

The O K System provides a high degree of flexibility. Accuracy is maintained down to the last grind by being able to quickly advance the blades in line of wear. Time is saved by having the right blade for routine and special jobs always in reserve. Economy is promoted by having only the cutting edges of high speed steel.

An O K engineer will gladly help you with your metal working problems.

There's an O K Inserted-Blade tool for every metal cutting job.

THE O K TOOL COMPANY, SHELTON, CONN., U.S.A.

TRADE O K MARK

INSERTED-BLADE METAL CUTTING
TOOL SYSTEM

ON GUARD Against Misfits

Dial Indicators are imperative for controlling the dimensions of finished defense material. Interchangeability, so absolutely necessary to mass production, can only be obtained by duplicating parts precisely. Dial Indicator Gages check the sizes of parts faster than is possible by old style fixed gages. They can be so arranged as to enable the inspector to check several dimensions simultaneously and they show *immediately* exactly how the dimensions compare with the master or the specified size. All human uncertainties of touch or "feel" are eliminated. You *see* directly how the size compares. Federal is supplying many types of Dial Indicator Gages for checking munitions and parts of defense equipment. Write for catalog and suggestions.

FEDERAL PRODUCTS CORPORATION, PROVIDENCE, R. I.

FEDERAL

PRECISION MEASURING INSTRUMENTS

Chicago • *Cleveland* • *Detroit* • *Hartford* • *Muncie*
New York • *Philadelphia* • *Pittsburgh* • *Rochester*

HELPING SOLVE INDUSTRY'S PRODUCTION PROBLEMS

Taking the guesswork out of TOOL INSPECTION

Measuring machines developed by "Illinois Tool" engineers made possible the accurate checking of cutting tools!

Correct sharpening is the most important factor affecting the accuracy and productivity of metal cutting tools.

Hobs, shaper cutters and other tools that generate a conjugate profile on the work can be a complete failure if sharpened incorrectly. Similarly, milling cutters, formed cutters and other rotary cutting tools will deliver more accuracy and dollar value if all cutting teeth do an equal share of the work.

The only way to indisputably determine whether all cutting teeth are "workers" instead of "shirkers" is to check each tool after sharpening on fundamentally sound inspection equipment. It will pay you to investigate the economic benefits of an installation of ILLINOIS Measuring Machines in your tool grinding department.

ILLINOIS
MEASURING MACHINES FOR CUTTING TOOLS
Universal Cutter and Hob Measuring Machine
Hob Lead Measuring Machine
Hob Tooth Profile Measuring Machine
Universal Hob and Worm Measuring Machine
Shaper Cutter Sharpening Inspection Fixture

ILLINOIS TOOL WORKS

MANUFACTURERS OF METAL CUTTING TOOLS AND SHAKEPROOF PRODUCTS

2501 N. KEELER AVENUE, CHICAGO, ILLINOIS · IN CANADA: CANADA ILLINOIS TOOLS, LTD., TORONTO, ONTARIO

Copyright 1941, Illinois Tool Works

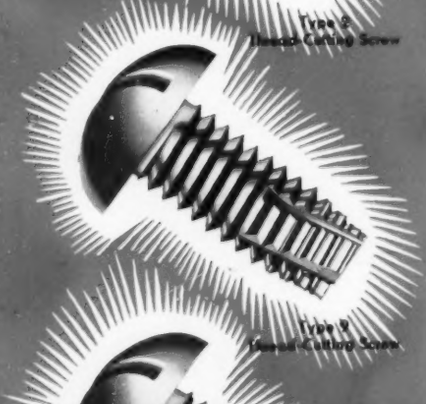
GET TIGHTER STRONGER FASTENINGS... reduce costs and speed-up production with...

SHAKEPROOF

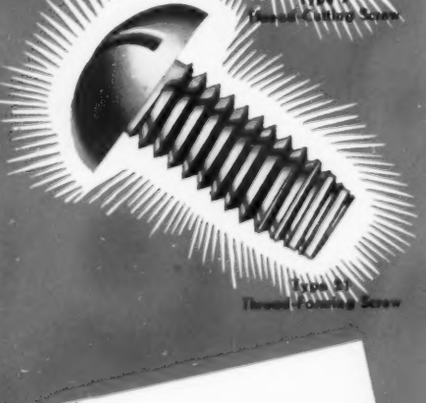
Thread-Cutting Screws

Type 1 Thread-Cutting Screw

Type 2 Thread-Cutting Screw



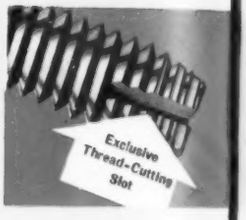
Type 9 Thread-Cutting Screw

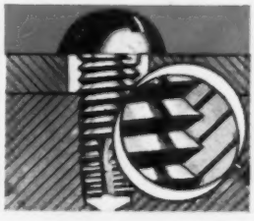


Type 23 Thread-Forming Screw

ACTUALLY *Cut* THEIR OWN THREADS!

By means of the exclusive slot with its serrated cutting edge, this type of screw does not merely indent its threads in the work—it actually cuts like a tap, producing a clean, standard machine screw thread. Tapping is eliminated—you simply drill, then drive—that's all!



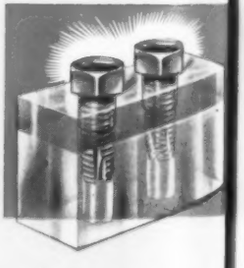


A TIGHTER, STRONGER FIT ASSURED

Because each screw remains in the threads it has cut itself there is a perfect fit between screw and work. The absence of "play" makes it extremely difficult for vibration to start any loosening action—thus the fastening is definitely both tighter and stronger than can be normally expected when machine screws are driven into pre-tapped holes.

SPECIAL TYPES FOR PLASTICS!

Type 2, with its double-width thread-cutting slot was specially developed for use in plastics. Type 9, which can also be used in metals, is thoroughly practical for plastic applications, too. The use of these screws eliminates the need for threaded inserts or separate tapping operations. They can be used in any type of plastic material and in laminated or molded sections without danger of fracturing.



Free Samples

A test of Shakeproof Thread-Cutting Screws on your own product should interest you. Be sure to indicate the particular types you want.

SHAKEPROOF LOCK WASHER COMPANY

Distributor of Shakeproof Products Manufactured by ILLINOIS TOOL WORKS

2501 North Keeler Avenue, Chicago, Illinois

Plants at Chicago and Elgin, Illinois

In Canada: Canada Illinois Tools, Ltd., Toronto, Ontario

Copyright 1941 Illinois Tool Works

ALL SHAKEPROOF SCREW PRODUCTS ARE AVAILABLE WITH PHILLIPS RECESSED HEADS!

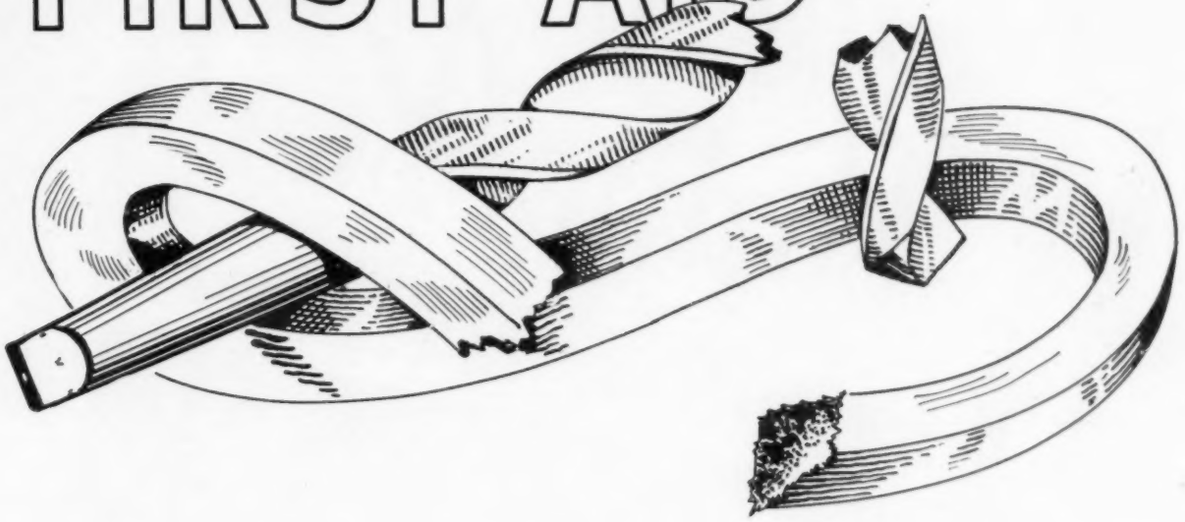
"Fastening Headquarters"

SHAKEPROOF

SEMS Fastener Units . . . Lock Washers . . . Locking and Plain Terminals

Thread-Cutting Screws . . . Locking . . . Spring Washers . . . Special Stamp

FIRST AID



FOR BREAKDOWNS

When you break a drill, wreck a V-belt, burn out furnace brick, or rust out a length of pipe—it's important. Time lost in repair is production lost. When you need help and need it quickly—call your industrial distributor. He's specially trained to render first aid to production. On his shelves are new drills, V-belts, furnace brick, pipe, and *over 20,000 other items,* ready to pitch in and help you get things rolling again—and to keep 'em rolling.

Your industrial distributor has a stock of as many as 400 shapes and sizes of drills, taps, dies and reamers, many types and sizes of valves, all the sizes of V-belts—and so on for the total of more than 5,000 different *kinds* of supplies. He stocks these items just to be ready at a moment's notice to meet your need.

And meet it he will—by truck, train, bicycle—or boat if need be—for his is a business built upon service. His readiness to help in emergency is but one phase of the continuing service he renders in meeting your production and maintenance needs for industrial supplies.

Patronize your local distributor—he is trained and prepared to give you minute-man service from stock.

THE MAGAZINE FOR INDUSTRIAL DISTRIBUTORS AND THEIR SALESMEN

MILL SUPPLIES *A McGRAW-HILL PUBLICATION*
330 W. 42ND ST., NEW YORK

Boring Bars

with FABRICATED STELLITE WEAR STRIPS

FOR ALL MACHINES

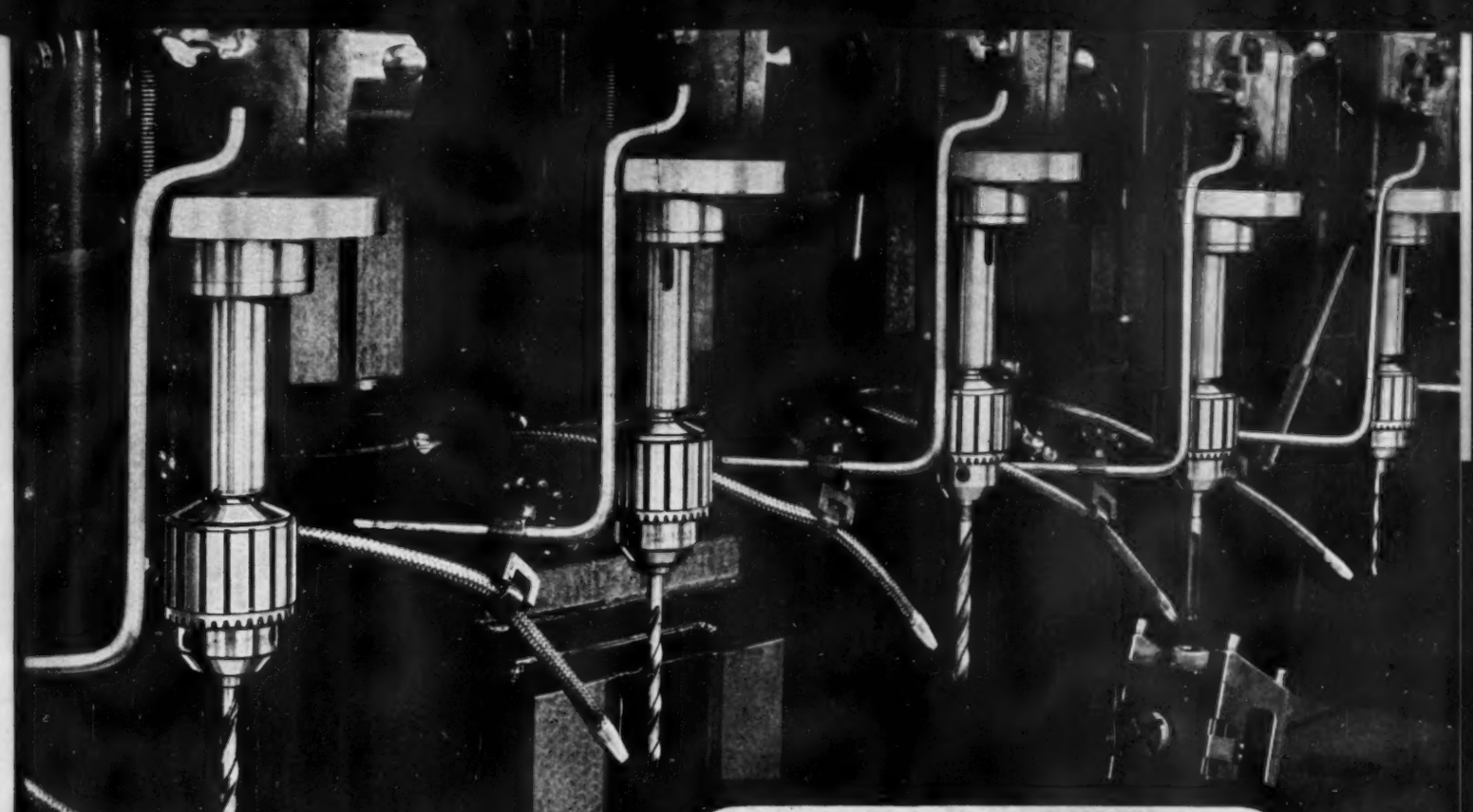
* Where accuracy is essential micrometer adjustment in boring bars sets the pace.
* Today Scully-Jones is meeting the demands of Aircraft and Automotive Industries with tools for applications where precision is the important factor.
* Illustrated are a few of the many bars built by Scully-Jones for use in the nation's key defense plants. These bars can be made with High Speed Steel, Stellite or Tungsten Carbide tool bits.
* Our experienced Engineering Staff is here to serve you.

** Additional information sent on request.*

For a long service life Stellite wear strips are furnished on boring bars because of their high resistance to abrasion and heat.

The set screw method of holding permits replacement as well as diameter change by shimming.

SCULLY-JONES & CO.
1901 SO. ROCKWELL ST.
CHICAGO · ILLINOIS



NEW JACOBS DESIGN
MEETS WITH
ARMY ACCEPTANCE

These newly designed Jacobs Chucks were photographed in action on a battery of gang drills operating on fuse bodies in the Metal Components Department of the Picatinny Arsenal at Dover, N. J. Here—as well as everywhere throughout the Industry—the new Jacobs Chucks serve with true dependability.

IF IT'S A

Jacobs

IT HOLDS!

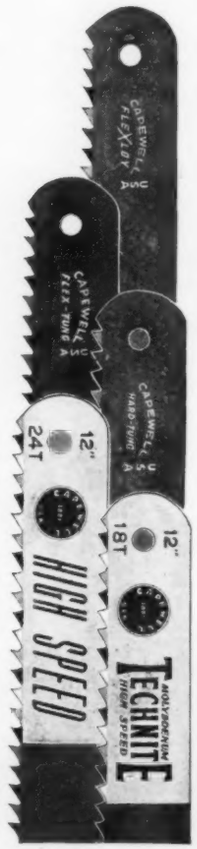
THE JACOBS MANUFACTURING CO.
Hartford, Conn., U. S. A.

DOUBLE-BARRELED SAVING

Records for shortened cutting time and for longer service life, have been hung up during our tests. That's why we dare to make our offer: — "Test Capewell blades yourself; on your own job determine the % of saving." Simply order a test lot from your mill supply man today.

1. TECHNITE — new analysis molybdenum high speed blade for hard-to-cut alloys;
2. HIGH SPEED — tungsten high speed (18-4-1) blade. Capewell heat treating makes them outcut other blades of this type;
3. HARD-TUNG — tungsten all-hard hack saw blade for general service;
4. FLEX-TUNG — tungsten flexible-back, tooth-hardened, hand hack saw blade for general service;
5. FLEXLOY — molybdenum alloy, the best flexing, yet all-hard, hand blade for everyday use.

The Capewell Mfg. Co., Hartford, Conn.



CAPEWELL
HACK SAW BLADES

GROBET FILES and SAWS

Insure Greater Precision and Production . . .

. . . in 1941 by Standardizing on the "ORIGINAL" SWISS PRODUCTS

Back of Grobet Swiss Files is accumulated experience extending back one hundred and twenty-five years. These precision tools have long since been proved first for service, economy, speed and precision. By keeping pace constantly with the needs of file users, Grobet has been able to develop tools which are scientifically right for the service demanded of them. Completeness of the Grobet line will enable you to profit by standardizing on them for all your filing and sawing operations.

GROBET FILES for filing machines

These precision tools assure highest quality work from filing machines. They can be depended on to cut faster and wear longer. Made of chrome steel for maximum hardness; available for all types of machines. Send for catalog DM.

GROBET SAWS

The Grobet line includes coil and blade style saws with flexible backs—saws that render long service and save money.

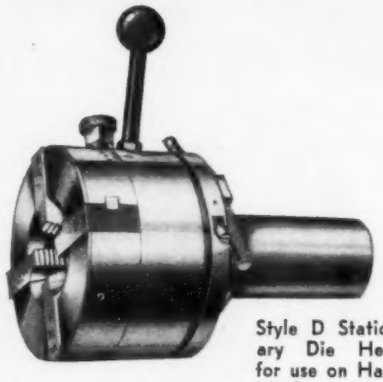
GROBET ROTARY FILES

Available from Grobet in hundreds of shapes—hand cut, milled cut, ground from the solid, and Diesinkers' Burs. Send for Catalog DG.

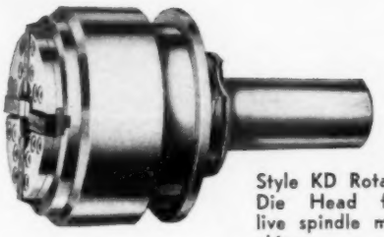
5000 GROBET Swiss Files for All Purposes

More than 5000 Swiss Precision Hand Files, in 9 numbers of cuts, are described in the Grobet Catalog DF. Send for a copy which gives full information on the complete line, shapes and types. Full information on Circular Saws, Small High Speed Steel Flat Drills, Gravers and Tools is also available on request.

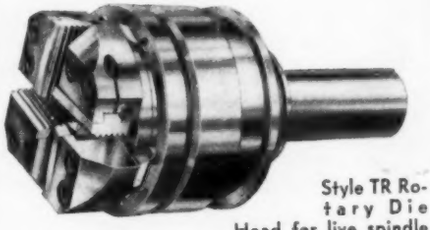
Grobet File Corp. of America
3 Park Place New York, N. Y.



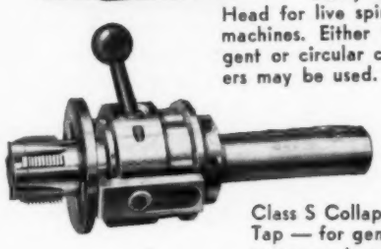
Style D Stationary Die Head for use on Hand Machines.



Style KD Rotary Die Head for live spindle machines.



Style TR Rotary Die Head for live spindle machines. Either tangent or circular chasers may be used.



Class S Collapsing Tap — for general purpose tapping.

Precision Threading Machines. Built in 3 sizes.

Better Tools for Better Threads

Better tools for better threads—that has been the aim of The Geometric Tool Company since 1895.

DIE HEADS

For external threads from .050″ to 10″ in diameter, Geometric builds several different lines of Self Opening Die Heads. The tool to use depending on the machine on which it is to be mounted. Geometric also makes Solid Adjustable Die Heads, Taper Cutting Die Heads, etc.

TAPS

Internal threads from 1″ to 12″ in diameter can be threaded with Geometric Collapsing Taps. You'll also find Geometric Solid Adjustable Taps and Receding Chaser Taps.

THREADING MACHINES

For precision threading on duplicate parts Geometric builds a line of easy-to-operate, accurate threading machines.

RESHARPENING EQUIPMENT

For resharpening chasers there's a complete chaser grinder—or a choice of several different types of grinding fixtures.

If it is better threads you want, why not let a conveniently located Geometric representative show you how to get the kind of threads you want?

The Geometric Tool Co.

NEW HAVEN, CONN.

Specialists in threading tools since 1895.

Clover Products

MUST EARN THE RIGHT

to this mark of CLOVER QUALITY

Under the critical eyes of Clover engineers and chemists, the manufacture of Clover Coated Abrasives is a routine of rigid control. Nothing is left to chance. And before the finished product can leave the Clover Plant, it must prove by actual performance tests that it can do the work for which it is recommended. Only in that way can it earn the right to carry the *Mark of Clover Quality.*

COATED ABRASIVES AT THE RIGHT PRICES FOR YOUR EVERY SANDING NEED

If your distributor cannot supply you, write us direct. Also ask us for informative Abrasive Manual, and for free working sample offer. Address DEPT. H.

CLOVER MFG. CO., NORWALK, CONNECTICUT

WANT BETTER GRINDING AND LAPPING COMPOUND? DEMAND CLOVER—FAMOUS FOR 38 YEARS

Supplied in eight grades, there is a Clover Compound for your every need. Look for the famous green can.

CLOVER

Coated Abrasives

Easily Identified by Color-Striping and the Famous Clover Trade Mark

QUALITY ABRASIVES SINCE 1903

SPEED-UP YOUR TAPPING PRODUCTION WITH

Ettco-Emrick TAPPING ATTACHMENTS

OUTSTANDING FEATURES

- BALL BEARING MAIN SPINDLES
- NEEDLE BEARINGS ON INTERMEDIATE SHAFTS
- ALL HELICAL GEARS — quiet and efficient
- SENSITIVE FRICTION CLUTCH — provides a positive drive that releases the instant tap sticks or bottoms
- AUTOMATIC REVERSE
- TAP IDLES "IN" — speeds up tapping; doubles tap cutting edge life.
- POSITIVE, VISIBLE GRIP TAP HOLDING CHUCK.

CLAMP an Ettco-Emrick Tapping Attachment on the spindle of your drill press and you can tap as fast as tapping can be done.

And in addition to top tapping speed you are assured of accurate threads and full tap protection.

These outstanding advantages of Ettco-Emrick Tapping Attachments are due to a combination of the design and construction features listed at the left—the fruit of 25 years of tapping specialization.

Try an Ettco-Emrick Tapping Attachment and you will find, as hundreds of satisfied users have, that it is far ahead of any other device on the market today for smooth, sensitive, fast and accurate machine tapping.

BULLETIN No. 2 gives full details. Write for a copy today.

And remember this—whenever you have a tapping problem—our years of experience with all kinds of machine tapping is at your service. Just write us.

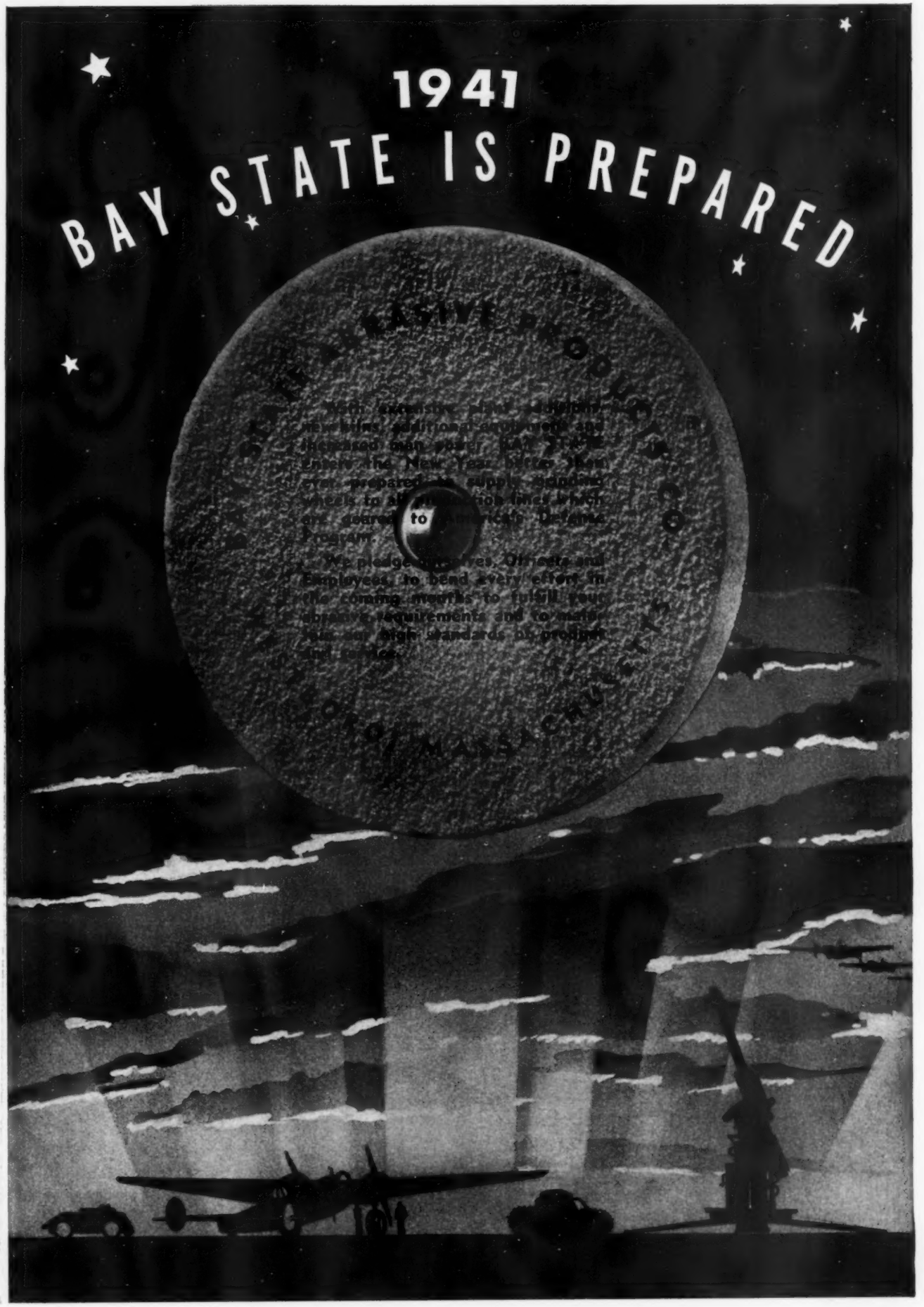
ETTCO TOOL CO.

590 Johnson Ave. Brooklyn, N. Y.

DETROIT CHICAGO

The Famous Ettco-Emrick **DRILL CHUCKS • TAP HOLDING CHUCKS TAPPING ATTACHMENTS • TAPPING MACHINES MULTIPLE SPINDLE TAPPING AND DRILLING HEADS**

Unexcelled for Design, Materials and Workmanship


1941
BAY STATE IS PREPARED
to
COMMONWEALTH OF MASSACHUSETTS

Try VICTOR'S

HIGH SPEED

TWIST DRILLS

ONE OF THE FINEST

POLISHED FLUTES

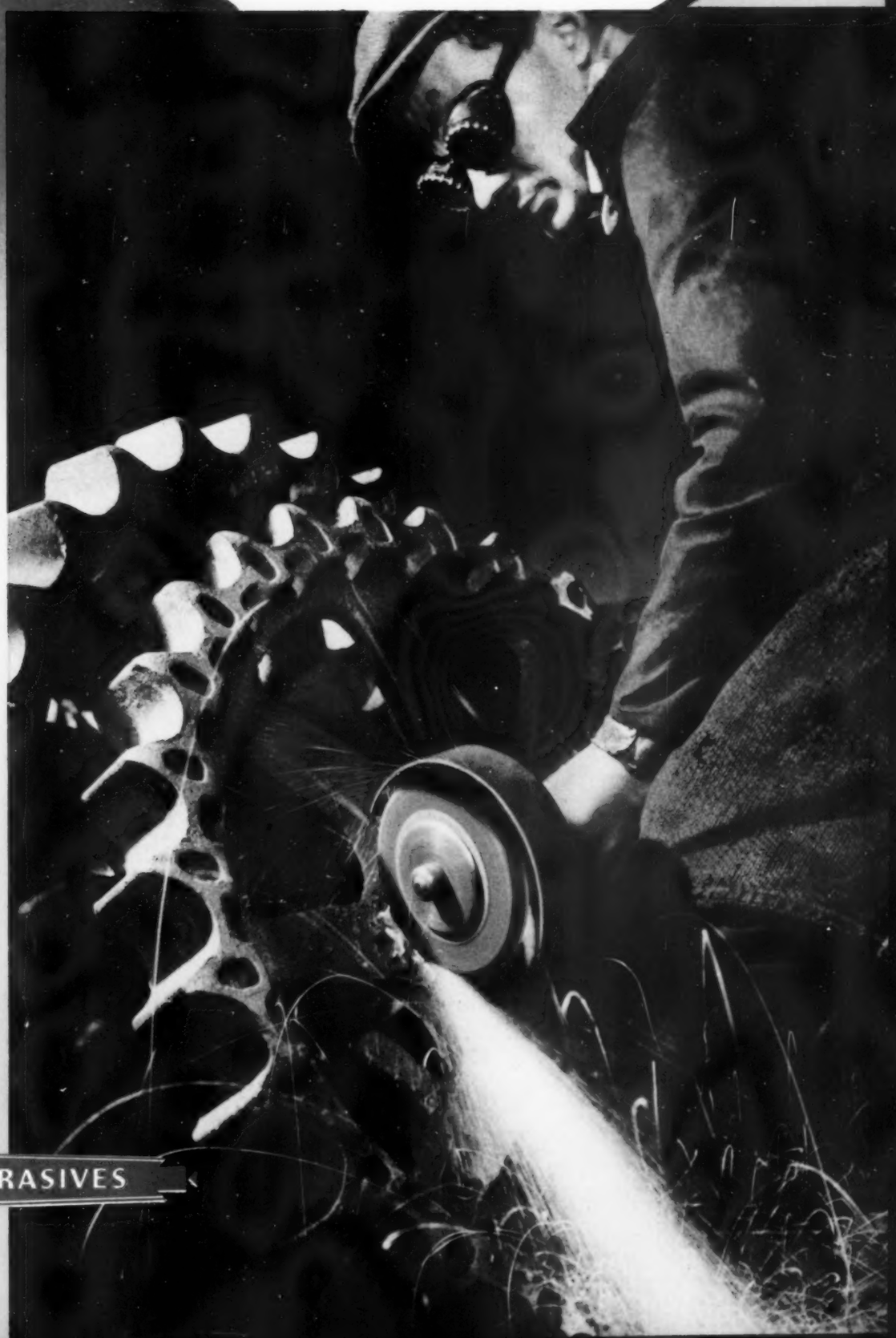
Sizes ranging from 1/16 to ½ in. by sixty-fourths, also Nos. 1 to 60 and Letter Sizes A. to Z. Also drills 12 in. long. 7/32 to ½-in., with 9-in. cutting flutes.

Send for Catalogue

VICTOR MACHINERY EXCHANGE

251 CENTER STREET, NEW YORK, N. Y.

Complete NORTON GRINDING SERVICE



FROM the Norton laboratories have come special Resinoid Bonded Grinding Wheels for various types of work—such as snagging, billet grinding, weld finishing, cutting off, disc grinding, roll grinding. And Norton engineers the country over are ready to insure their correct application on your grinding operations.

It is a typical example of the complete Norton Service embracing research, engineering, manufacture and distribution.

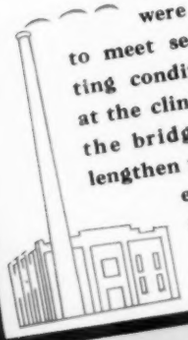
NORTON COMPANY
Worcester, Massachusetts

NORTON ABRASIVES

Norton Service for handling heat

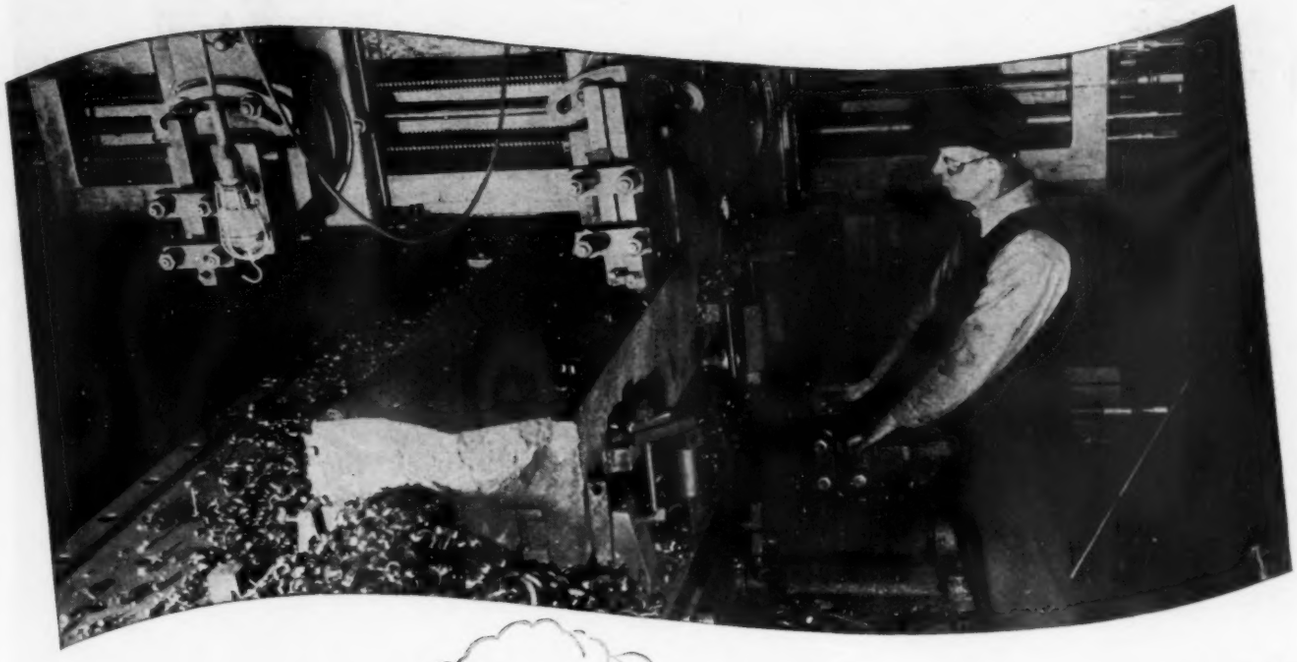
TYPICAL of the Norton refractory products that are enabling industry to handle heat more effectively are Crystolon Hearth Plates for heat treating furnaces. Their features are high refractoriness, high strength, high heat conductivity, resistance to spalling and to abrasion. And they are characteristic features of the complete line of Norton heavy duty refractory products—cements, bricks, muffles and other shapes.

Are your boiler furnaces ready for uninterrupted peak operation?



Crystolon Brick were developed to meet severe operating conditions. Used at the clinker line and the bridge wall they lengthen the life of the entire boiler furnace lining.

NORTON REFRACTORIES



"It Just Keeps Rollin' Along!"

PRODUCTION, like Ol' Man River, has to set a pace and maintain it. It's a double-edged problem for which we've been supplying answers for almost a century. There's an A-L Tool Steel that will give you *performance*—let you set a "max" schedule; perhaps even save you from expanding into more plant. The same steel brings you complete uniformity from lot to lot, meaning *schedule maintained.*

We've backed these advantages with dependable supply from stocks coast to coast, and with a Mill Service organization experienced in avoiding "trials and errors" for you. ● Let A-L Fine Tool Steels keep you *rollin' along!*

ALLEGHENY LUDLUM STEEL CORPORATION
GENERAL OFFICES: PITTSBURGH, PA.

★ ★ ★ **ALLEGHENY LUDLUM** ★ ★ ★

FINE TOOL STEELS
SINCE 1854

Write for a copy of our new "Handbook of Special Steels." Send the coupon to Allegheny Ludlum Steel Corporation, Tool Steel Division, Watervliet, N.Y.

Name .....

Street .....

City ..... *State* T-102

The Spotlight's on OMEGA

The "Shock-resister" of Bethlehem's 8 tool-steel kit

Bethlehem's 8 tool-steel kit offers you a compact set of tried-and-proved tool steels that will handle 90 per cent of the jobs in any shop. By using this group of steels you can cut inventories, simplify heat-treatment, and develop standard practices which will save time and produce better finished parts. Each steel in the 8 tool-steel kit is an outstanding performer in its own right.

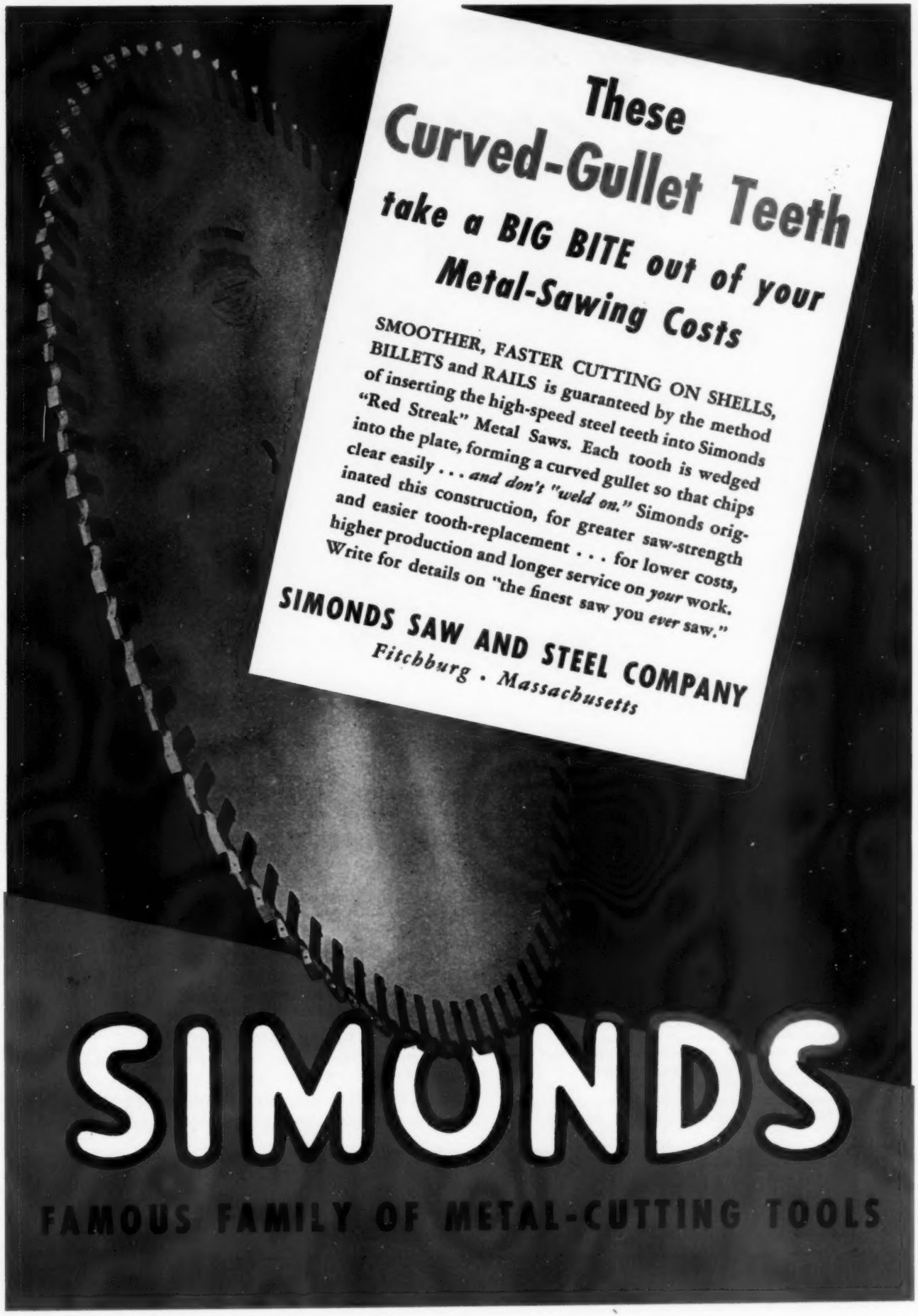
For Example

Omega is Bethlehem's answer to the call for super-shock-resistance in tool steel. This steel is an old standby in beading tools, pneumatic chisels, calking tools, punches, dies, heading tools and a host of similar applications. Omega can be economically forged and heat-treated. When oil-quenched at 1600 deg. F. and tempered at 450 deg. F., Omega develops a Rockwell hardness of C59, a tensile strength of 340,000 p.s.i., and a torsional impact value of 108 ft. lbs. This steel has earned a nation-wide reputation for long dependable service in all types of impact service.

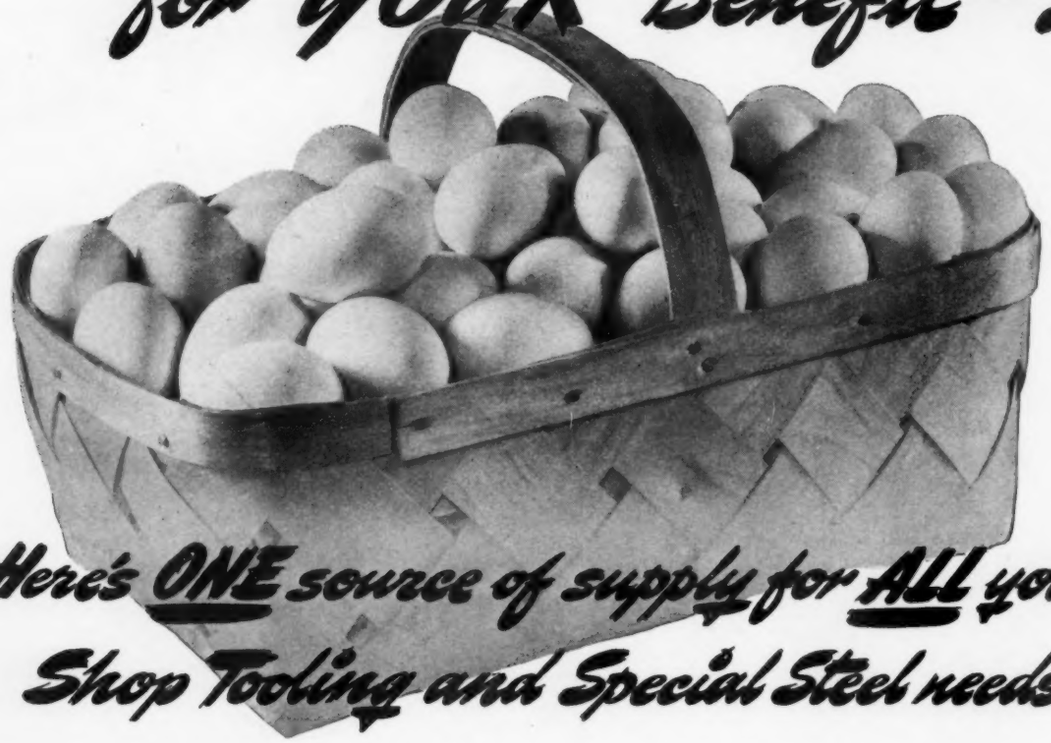
Write to Bethlehem Steel Company, Bethlehem, Pa., for detailed information on the 8 tool-steel kit. We'll send it without any obligation on your part.

BETHLEHEM STEEL COMPANY

BETHLEHEM STEEL


These
Curved-Gullet Teeth
take a BIG BITE out of your
Metal-Sawing Costs
SMOOTHER, FASTER CUTTING ON SHELLS, BILLETS and RAILS is guaranteed by the method of inserting the high-speed steel teeth into Simonds "Red Streak" Metal Saws. Each tooth is wedged into the plate, forming a curved gullet so that chips clear easily . . . and don't "weld on." Simonds originated this construction, for greater saw-strength and easier tooth-replacement . . . for lower costs, higher production and longer service on your work. Write for details on "the finest saw you ever saw."
SIMONDS SAW AND STEEL COMPANY
Fitchburg • Massachusetts
SIMONDS
FAMOUS FAMILY OF METAL-CUTTING TOOLS

Reversing the adage . . . for YOUR Benefit—!



Here's ONE source of supply for ALL your Shop Tooling and Special Steel needs

"PUT all your eggs in one basket," the canny Carnegie once said,". . . and then watch the basket!" We invite you to try it.

Put all your shop tooling problems up to Firth-Sterling—and watch the results!

The completeness of our companion lines enable us to render a full and impartial service. When your tooling problems require *both* Steel *and* Sintered Carbides, we *have* both! Thus, your *needs,* alone, determine our recommendations.

FOR MACHINING OF ALL KINDS

FIRTHITE SINTERED CARBIDE—***Super*** cutting tools.
CIRCLE ©—a ***Super*** High Speed Steel for severe work.
BLUE CHIP HIGH SPEED STEEL—for general shop use.
SPECIAL GRADES OF HIGH SPEED STEEL—for particular requirements.

FOR BLANKING, STAMPING AND FORMING DIES

CROMOVAN—High Production Die Steel.
AIRVAN—Air-hardening Die Steel.
INVARO—"Non-shrinking" Die Steel.
SPECIAL A. S. V.—"Center-free" Carbon Tool Steel.
STERLING XX—Cold Heading Die Steel.
FIRTHITE SINTERED CARBIDE—for Stamping.
FIRTHALOY SINTERED CARBIDE—for Drawing and Extrusion Dies; Wire Forming and Heading.

FOR HOT WORK: FORMING—PIERCING—HEADING

XDH, XDM and XDL—Extrusion Die Steels.
LT and LTL—Tungsten Hot Work Steels.
HWD and CYW—Chromium Hot Work Steels.

FOR FATIGUE RESISTING TOOLS

J. S. PUNCH & CHISEL STEEL.
SPECIAL PISTON STEELS.
CHIMO AIR-HARDENING CHISEL STEEL.

FOR CORROSION RESISTANCE

STERLING STAINLESS AND NIROSTA STEELS—for cutlery, bearings, wear parts, etc.

FOR WEAR RESISTING PARTS AND GAUGES

FIRTHITE AND FIRTHALOY SINTERED CARBIDE.

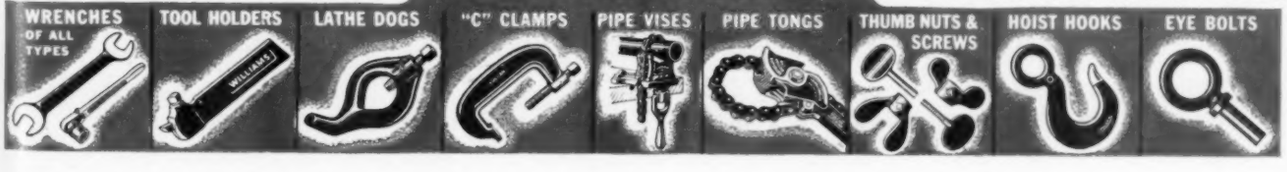
FIRTH-STERLING STEEL COMPANY

OFFICE AND WORKS:
McKEESPORT, PA.
BRANCH WAREHOUSES:
NEW YORK CHICAGO
HARTFORD PHILADELPHIA
LOS ANGELES DAYTON
CLEVELAND DETROIT

When it comes to Tool Holders, Lathe Dogs and Clamps, a safe short-cut to satisfaction is to standardize on Williams' products. For more than fifty years, Williams have been making top quality drop-forged tools and shop specialties.

In "Williams" Tool Holders you will find an improved line covering every regular operation on lathe, planer and shaper. Williams' "Vulcan" Lathe Dogs are made in single and double screw, straight and bent tail, safety and set screw patterns. Williams' Clamp line includes "C", Parallel Jaw, and Strap types —sold under the "Williams" and "Vulcan" trade names. Industrial distributors everywhere sell, and stock Williams' fully guaranteed tools.

J. H. WILLIAMS & CO. HEADQUARTERS FOR **225 LAFAYETTE ST., NEW YORK**



Here's a SUPER-BARGAIN ---- in Performance!

Vascoloy RAMET
T. M. REG. U. S. PAT. OFF.

Tantalum-Tungsten Carbide Tools are Cutting Steel at a Lower Cost per Cut

You've been hearing a lot about bargains recently—bargains in price, in size, and grade! But very little about bargains in performance—the day-in-day-out performance that cuts steel faster—the performance that pays production profit!

In the big production industries where outstanding jobs of steel cutting are being done every day, you will find that Tantalum Carbide tools are doing the job.

This is because Tantalum Carbide possesses a low coefficient of friction—a lubricating characteristic which enables it to cut steel smoothly, easily, with longer tool life.

The majority of the steel being cut in many of these plants is being cut with Vascoloy-Ramet Tantalum-Tungsten Carbide Tools.

This isn't just a claim. It's a fact—a fact based on the factors which make Vascoloy-Ramet tools the best carbide tools obtainable.

These factors are basic research and raw material control.

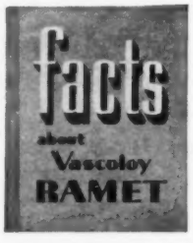
The Fansteel Metallurgical Corporation, parent company of the Vascoloy-Ramet Corporation, has devoted a decade to basic metallurgical research to improve carbide tools. It has the largest staff of scientists concentrating on this work of any organization in the carbide tool industry.

Fansteel is the sole American producer of Tantalum; one of the largest producers of Tungsten.

Scientific knowledge of these rare metals and the complexities involved in their proper blending, assure you carbide tools of superior performance.

Furthermore, the name Vascoloy-Ramet does not imply steel cutting alone. In addition to Tantalum Carbide, you will find in the Vascoloy-Ramet line, Tungsten Carbide, Tantalum-Tungsten Carbide, Titanium Carbide—*all* the combinations necessary to the cutting of all metals.

Back of all these fundamentals is the standing of the Vanadium-Alloys Steel Company; the engineering skill of the members of the Vascoloy-Ramet organization; and the experience of the leading tool manufacturers who can recommend the proper grade of any Vascoloy-Ramet tool for any specific use. Their service is further amplified by an assurance of early delivery.



Send for this manual. Get further facts about Vascoloy-Ramet performance.

VASCOLOY-RAMET CORPORATION
North Chicago, Illinois
an affiliate of
VANADIUM-ALLOYS STEEL COMPANY
Pittsburgh, Pennsylvania
and
FANSTEEL METALLURGICAL CORPORATION
North Chicago, Illinois

Factory Owned Branches: Jersey City, Detroit, Cleveland, Pittsburgh, Cincinnati, Hartford, Providence, Philadelphia.
Authorized Agents in Principal Cities
In Canada: Carbide Tool and Die Company, Ltd., Hamilton, Ont.

ABRASIVES

...Essential to Metal-Working Production

The urge for faster production demanded by the defense industries has given added importance to grinding as a means of working metal parts. The efficient performance of the abrasive grinding wheel, therefore, is of serious concern to production executives responsible for grinding procedure. The wide variety of size, shape and grain and grade combinations of Abrasive Company Grinding Wheels permit the selection of the most efficient wheels for your grinding operations, whether it be a question of fast stock removal for rough snagging in foundries and steel mills or the finest precision grinding on metal-working production lines • Abrasive Company Engineering Service is available for the solution of grinding problems throughout industry and we welcome the inquiries of interested production executives.

AMERICAN DEFENSE COMES FIRST

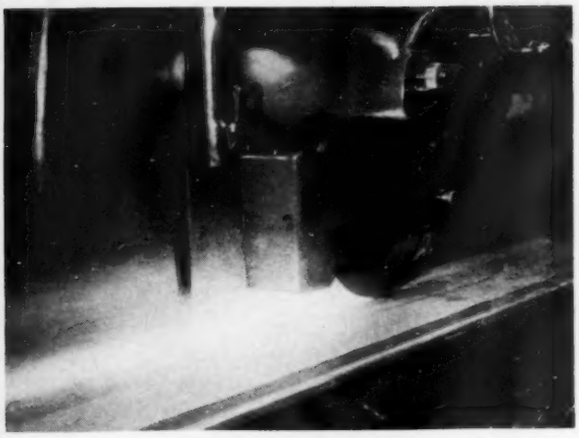
ABRASIVE COMPANY

Division of Simonds Saw and Steel Company, Tacony and Fraley Sts., Philadelphia, Pa.

ELECTRIC FURNACE PLANT: ARVIDA, QUEBEC, CANADA • CHICAGO BRANCH: 127 S. GREEN STREET

DISTRIBUTORS IN ALL PRINCIPAL CITIES

PRODUCTION
INCREASED 15%
FOR
JONES & LAMSON . . .



WITH CORTLAND
Improved Grinding Wheels

● High accuracy and increased production are being maintained on important finish grinding operation in the Jones & Lamson plant at Springfield, Vt., with Cortland Improved Grinding Wheels.

The work being handled calls for the finish grinding of bed rails for J & L Universal Turret Lathes. Material is X-1315—5 to 8-grain size, carburized and hardened to 95 Scleroscope minimum. Finished size of the piece is 1.250" x 2.250" parallel and square to .0003. Rails are ground on Mattison heavy duty surface grinder. Since Cortland Wheels have been used on this job, production has been stepped up approximately 15%, making it possible to finish 8 pieces per hour.

. . The ability of Cortland Wheels to step up production and maintain high accuracy in finish grinding are the result of Cortland's long specialized experience and modern, improved manufacturing facilities applied to the production of abrasive wheels. You, too, will derive outstanding advantages from the use of Cortland Improved Grinding Wheels, because they can be depended on for uniformity, higher quality, longer service, cooler cutting and the removal of more metal between wheel dressings.

Cortland Improved Wheels are available for snagging and roughing requirements, as well as for precision grinding of all materials. Ask for our recommendations —Give Cortland Wheels an opportunity to speak for themselves on your work by giving them a convincing trial.

CORTLAND GRINDING WHEELS CORP.
Chester, Mass.

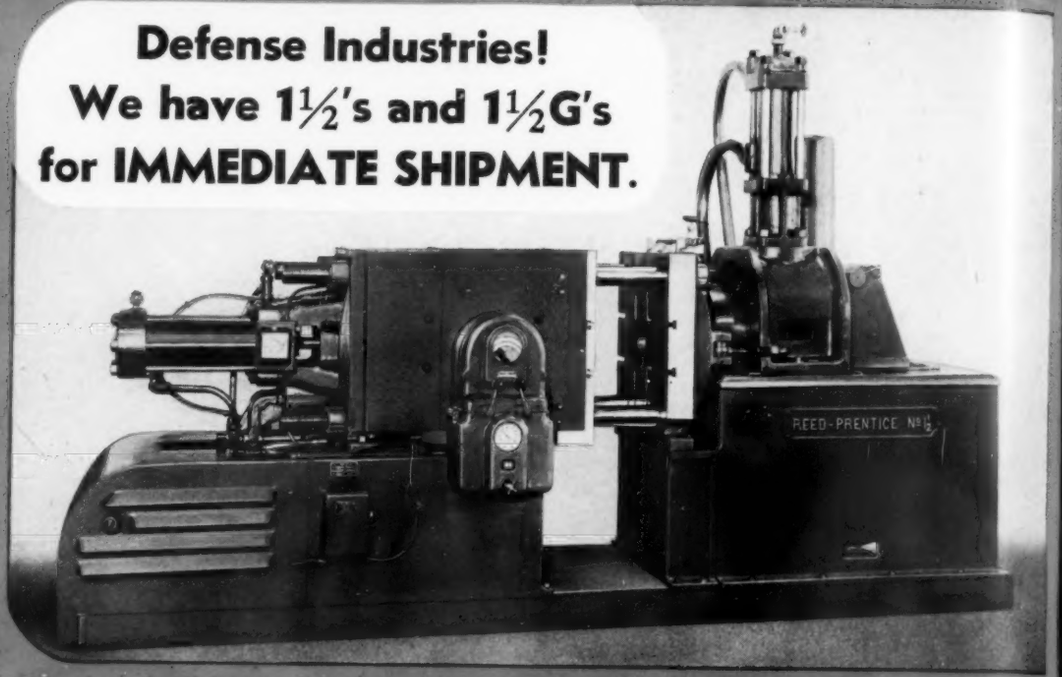
Presses, Forging and Molding Machines

MECHANICAL PRESSES • HYDRAULIC PRESSES • SHEARS AND BRAKES • FORMING ROLLS AND BENDERS • FORGING MACHINES • DIE CASTING MACHINES • PLASTIC MOLDING MACHINES • WIRE FORMING MACHINES

AMERICAN MACHINIST'S 28TH ANNUAL BUYERS REFERENCE NUMBER

MODERN REED-PRENTICE DIE-CASTING MACHINES

Defense Industries!
We have 1½'s and 1½G's for IMMEDIATE SHIPMENT.



NO. 1-1/2 FULL HYDRAULIC DIE CASTING MACHINE FOR ZINC, TIN OR LEAD BASE ALLOYS WITH SEMI-AUTOMATIC ELECTRIC CONTROL

Machine as shown is arranged for semi-automatic operation. It can also be furnished for manual operation. Available in two sizes.

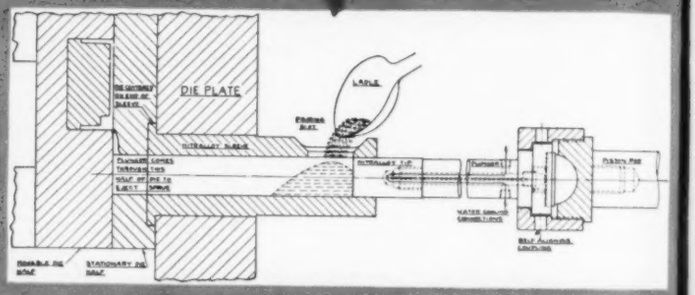
FEATURES:

• Fully hydraulic, with operations controlled by two levers, when manually operated, which are interlocked making it impossible to operate the plunger-cylinder until the dies are securely locked. • A safety pilot valve mechanism eliminates the danger of shooting the metal when the dies are open. • Dies provide for automatic ejection of castings. • Die plates are finished on all four sides to provide for core pulling attachments. In semi-automatic operation dies are closed manually after which cycle is controlled by automatic timing device.

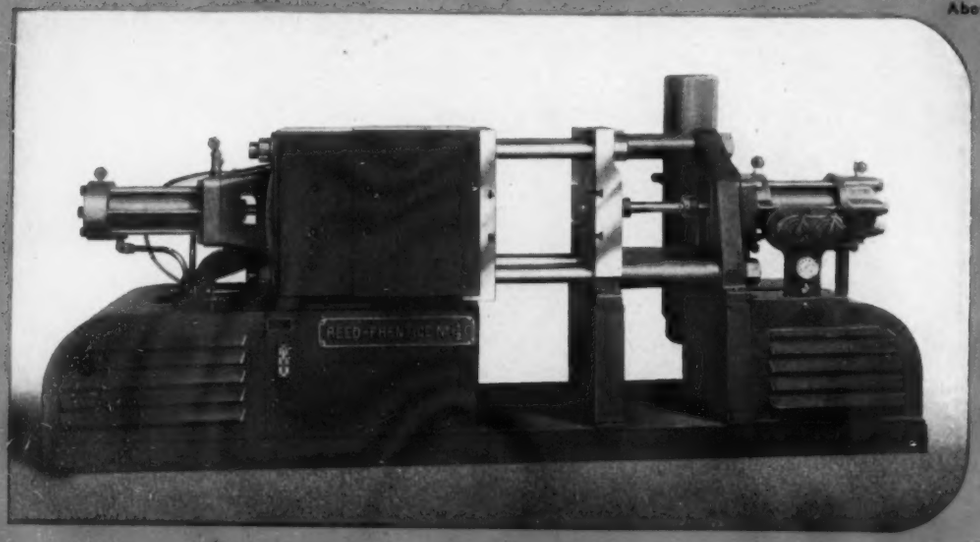
SPECIFICATIONS

	No. 1½	No. 2
Approximate size of die plates	28x29 in.	32x37 in.
Cap. of melting Pot (Zinc)	700 lbs.	900 lbs.
Space between bars	15x18 in.	18x21 in.
Die Opens	10 in.	12 in.
Maximum Die Space	18 in.	24 in.
Minimum Die Space	6 in.	8 in.
Locking pressure (Tons)	90	110
Weight	14300	16500

WRITE FOR COMPLETE DETAILS



Above line cut shows principle of operation, "G" type machine.



NO. 1½G HYDRAULIC HIGH PRESSURE DIE CASTING MACHINE — FOR ALUMINUM, BRASS, MAGNESIUM OR ZINC.

SPECIFICATIONS

	No. 1½G	No. 2G
Approximate size of die plates	28x29 in.	32x37 in.
Space between bars	15x18 in.	18x21 in.
Die opens	10 in.	12 in.
Max. Die Space	18 in.	24 in.
Min. Die Space	6 in.	8 in.
Locking Pressure (Tons)	90	110
Weight	11250	14100

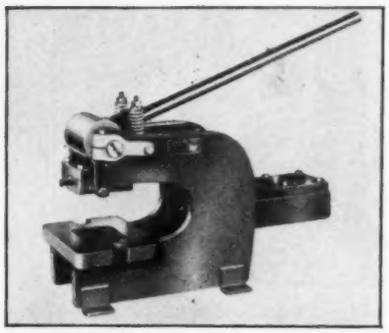
We solicit your die casting problems and offer a complete "Die Casting Service" including Machines, Dies, Design, for die cast parts in Zinc, Tin or Lead base alloys, Aluminum, Brass and Magnesium.

REED-PRENTICE CORP.

WORCESTER · · MASS., U. S. A.

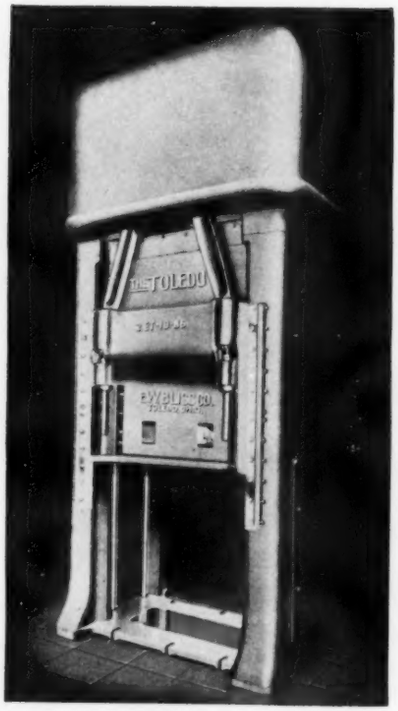
DIE CASTING MACHINES
PLASTIC INJECTION MOLDIN MACHINES
LATHES, ENGINE, TOOL ROO AND PRODUCTION
DIE SINKING MACHINES
VERTICAL MILLING MACHIN
JIG BORING MACHINES
SPECIAL PRODUCTION MACHI

PRESSES, FORGING and MOLDING MACHINES

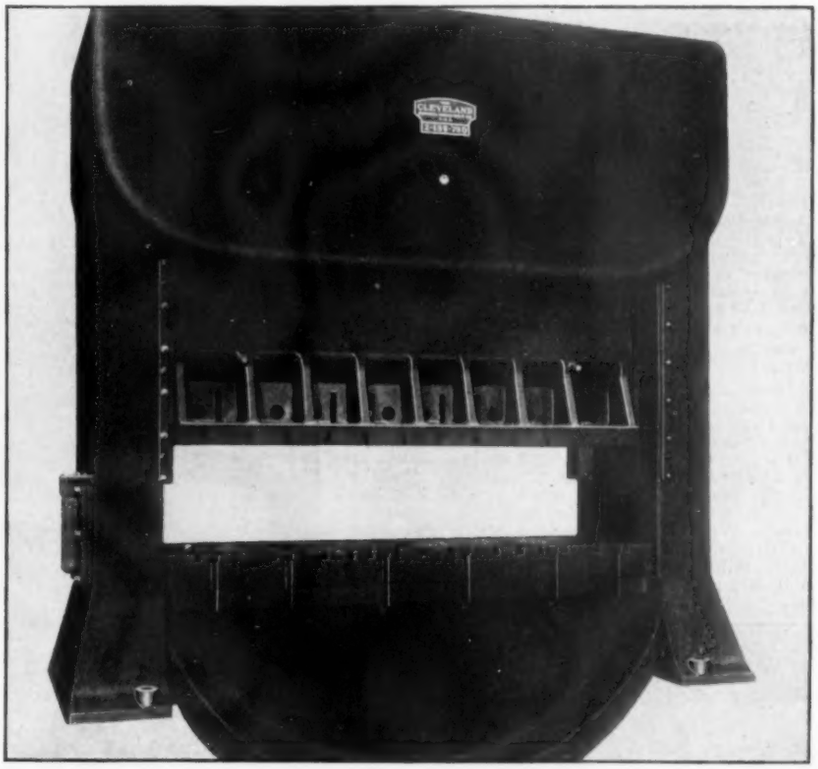


HAND PUNCH PRESS—*Leslie Welding Co., 2943 Carroll Ave., Chicago, Ill.* In this hand-operated punch press register of punches and dies is maintained by a leaf arm which is rigid except at its flexing point. Punch plate measures 4x4¼ in. and accommodates most blanking punches used on small power presses. Throat is 6 in. Stroke is $\frac{7}{16}$ in., with adjustment of ⅛ in. Press punches 14 gage mild steel or 16 gage 18-8 stainless steel. Vol. 84, p. 996.

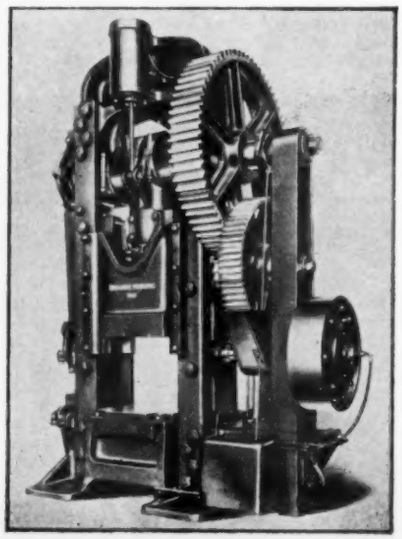
SPACING MACHINE—*G. F. Wittman, 20 Northwood Ave., Dayton, Ohio.* Holes can be spaced within 0.0005 in. with this marking layout and punching machine. It is recommended especially for experimental work and for short-run production jobs. It has a capacity of 7½ tons, an 8-in. throat, and a ½-in. stroke with ¾-in. ram adjustment. Vol. 84, p. 105.



TOGGLE PRESS—*Toledo Machine & Tool Div., E. W. Bliss Co., 1420 Hastings St., Toledo, Ohio.* Exceptionally long adjustment for high and low dies is provided in No. 2-E-10-86 straight sided double action toggle drawing press. Specifications: bed area, 62x86 in.; capacity of plunger slide, 650 tons. Vol. 84, p. 944.

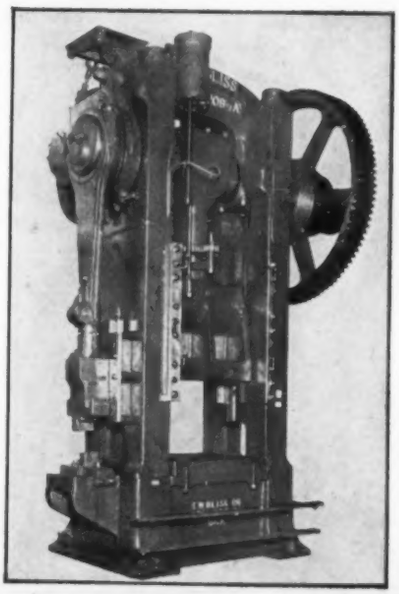


MECHANICAL PRESS — *Cleveland Punch & Shear Works Co., 3900 St. Clair Ave., Cleveland, Ohio.* This 750-ton two-point press measures 156 in. between uprights and has an over-all height of 260 in. The 52x156-in. bed is equipped with a T-slotted bolster plate and pneumatic cushions. Stroke is 12 in. Vol. 84, p. 991.

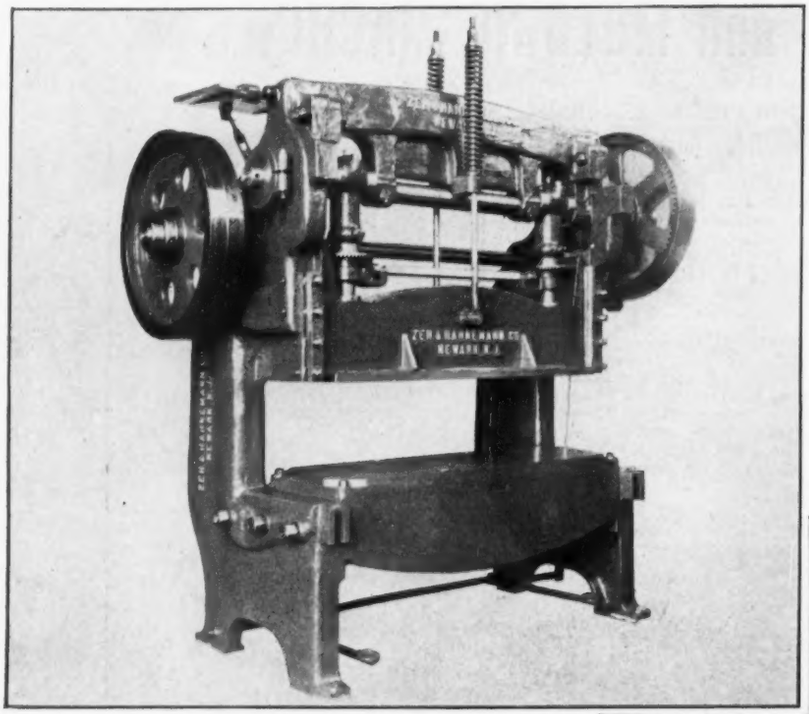


TRIMMING PRESSES — *Chambersburg Engineering Co., Chambersburg, Pa.* Double geared steel side trimming presses in capacities up to 1,000 tons are offered. Sizes of 150 tons and over are equipped with an improved pneumatically operated clutch. Oversize crank, use of outboard bearings on all shafts, reinforced pitman, extra large pitman pin, and gears cut from solid steel add to ruggedness. Vol. 84, p. 440.

TRIMMING PRESS—*E. W. Bliss Co., 53rd St. & Second Ave., Brooklyn, N. Y.* This No. 209½-A straight-sided single crank press is one of a line of trimming presses for forge shops. These presses are equipped with an outside-slide cut-off attachment for cutting flash, punching holes and trimming. Machine shown is single geared and operates at 25 strokes per min. Vol. 84, p. 310.

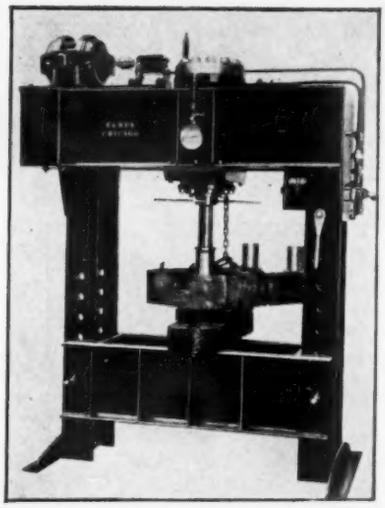


PRESSES, FORGING and MOLDING MACHINES

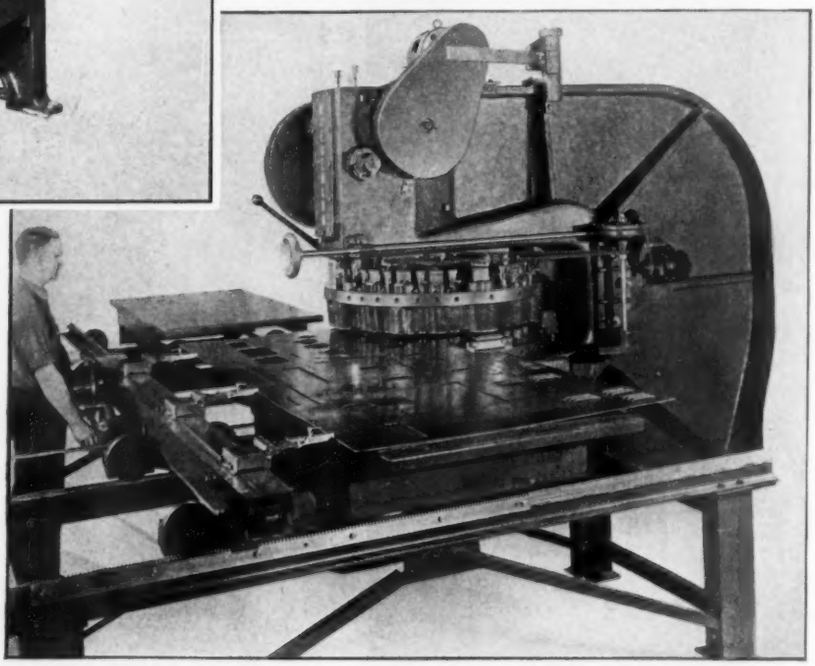


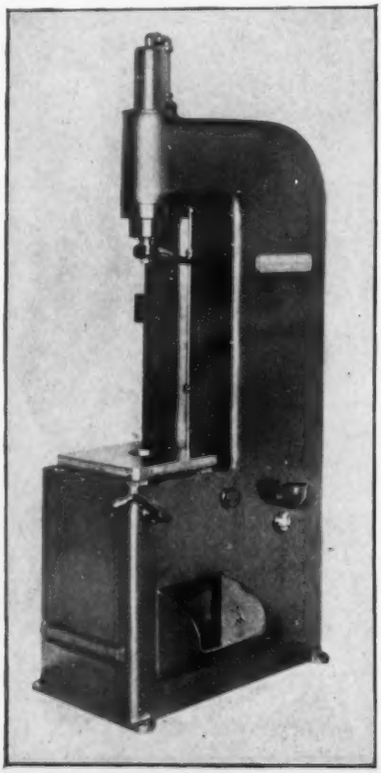
DOUBLE CRANK PRESS—*Zeh & Hahnemann Co., 182 Vanderpool St., Newark, N. J.* Type 13 double-crank, overhanging-type presses are made with plain or back-geared drives and employ a lever-type non-repeat clutch using a round clutch pin. Distance between uprights can be changed as can hole in bed. A 25 and a 36 ton size are available. Vol. 84, p. 66.

TURRET PRESS—*Wiedemann Machine Co., 1815-31 Sedgley Ave., Philadelphia, Pa.* Model R-8 motor-driven turret punch press has a 54-in. throat and can be equipped with a spacing table which will locate holes in sheets up to 50 in. wide, 100 in. long and ⅛ in. thick. It can be provided with 12 to 32 stations. Weight of the machine without spacing table is 2,100 lb. It will punch a 5-in. hole in ⅛-in. mild steel. With sheared punches, a 6-in. diameter or 6x6-in. square opening can be punched in ⅛-in. mild steel. Speed is 100 strokes per min. Vol. 84, p. 308.



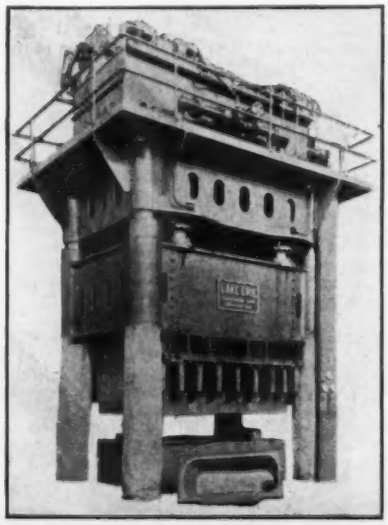
HYDRAULIC PRESS—*Charles F. Elmes Engineering Works, 230 N. Morgan St., Chicago, Ill.* With a 12-in. screw adjustment and a 12-in. ram stroke, this general-purpose hydraulic press has a total stroke of 24 in. Vol. 84, p. 1102.



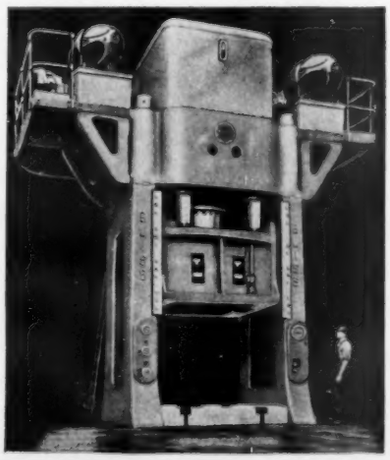


HYDRAULIC PRESSES — *Colonial Broach Co., 147 Jos. Campau St., Detroit, Mich.* "Senior" general purpose hydraulic presses are made in seven sizes: 1-ton, 18-in. stroke; 3-ton, 18- or 24-in. stroke; 6-ton, 24- or 36-in. stroke; and 10-ton, with 30- or 42-in. stroke. Vol. 84, p. 775.

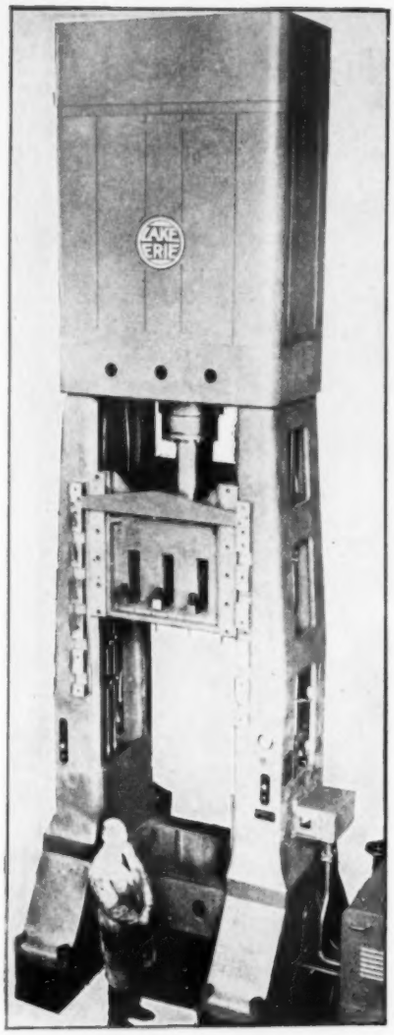
HYDRAULIC PRESS—*Lake Erie Engineering Corp., Buffalo, N. Y.* A 1,700-ton double-slide hydraulic press exerts a pressure of 900 tons on the blankholder and 800 tons on the main ram. Daylight opening is 98 in., stroke 37 in., bed 160x106 in. Vol. 84, p. 736.



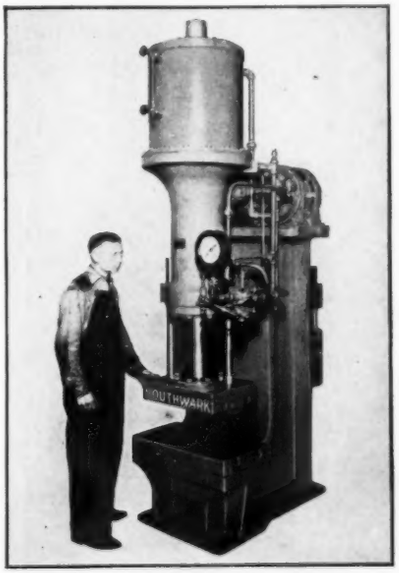
HYDRAULIC PRESS — *Hydraulic Div., E. W. Bliss Co., 53rd St. & Second Ave., Brooklyn, N. Y.* The 800—200-ton "Hydro-Dynamic" press is double-acting. Specifications: main slide capacity, 800 tons; blankholder slide capacity, 200 tons; bed cushion capacity, 150 tons; bed area, 84x85 in.; maximum slide stroke, 42 in. Vol. 84, p. 841.



PRESSES, FORGING and MOLDING MACHINES

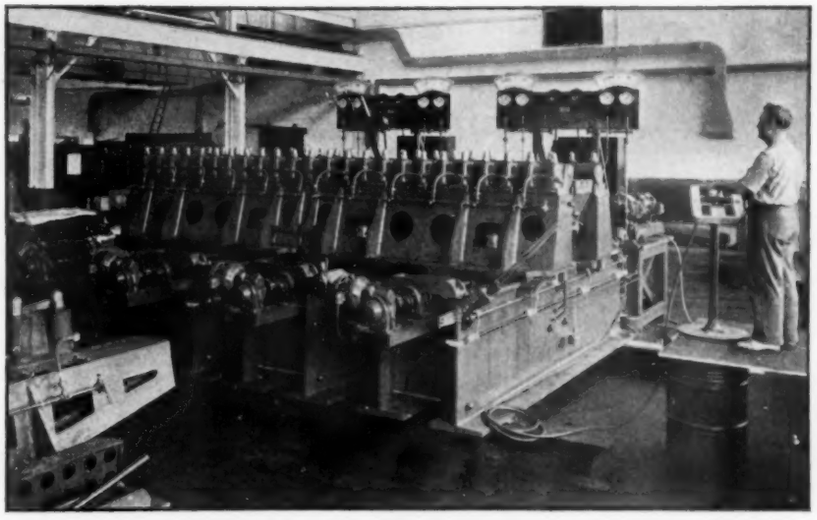


HYDRAULIC PRESS—*Lake Erie Engineering Co., 268 Perry St., Buffalo, N. Y.* An unusually long stroke 150-ton hydraulic press is especially designed for drawing cartridge cases. It has 108 in. daylight and a 76-in. stroke. Vol. 84, p. 643.



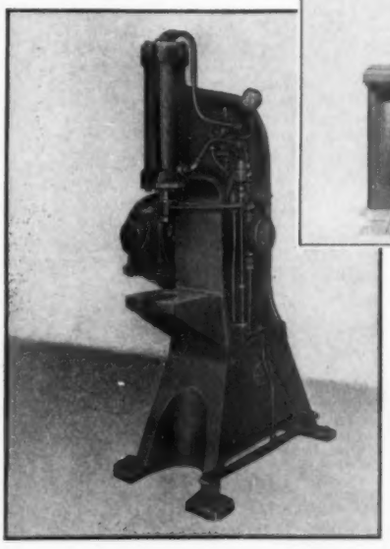
HYDRAULIC PRESSES—*Baldwin Southwark Div., Baldwin Locomotive Works, Philadelphia, Pa.* Hydraulic presses are built in 65 and 80 ton capacities. A single control, either hand or foot operated, permits the operator to inch, stop or reverse the platen at any point in its stroke. Another setting makes the press semi-automatic. Vol. 84, p. 352.

HYDRAULIC PRESS—*Greenerd Arbor Press Co., P. O. Box 415, Nashua, N. H.* Controlled even pressure may be held on work indefinitely with the No. H-57 6-ton hydraulic press. This machine gives pressure control of from ½ to 6 tons. Stroke is adjustable from 1 to 16 in. Vol. 84, p. 147.



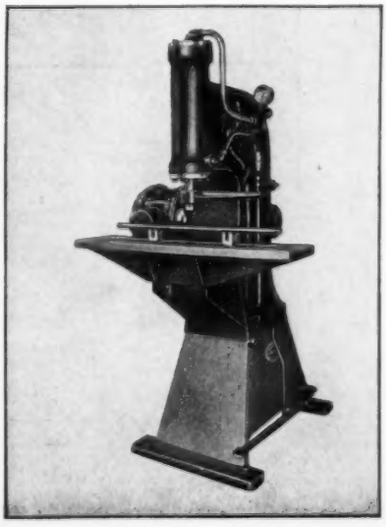
HYDRAULIC STRETCHING PRESS—*Engineering & Research Corp., Riverdale, Md.* This hydraulic stretching press consists of two "Erco" 300-ton hydraulic stretching units coupled in tandem for forming sheet metal by forcing a die upward into the work while the two edges of the sheet are restrained in clamps. Maximum stroke is 12 in. and operating pressure is 0 to 3,000 lb. per sq.in. Maximum distance between clamps is 80 in., minimum 24 in. Vol. 84, p. 30.

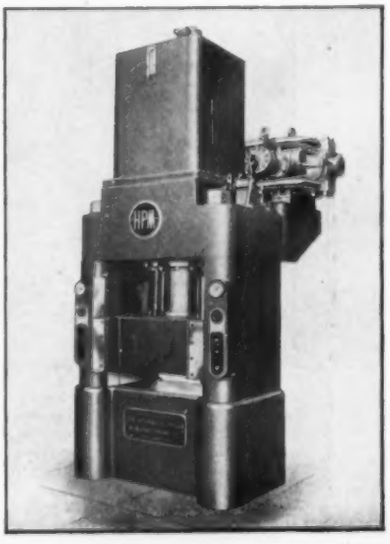
HYDRAULIC PRESS—*Denison Engineering Co., 236 N. Water St., Columbus, Ohio.* Type DLSC-1 vertical hydraulic press is designed for straightening, forcing and general production pressing. Two sizes are available, with capacities of 25 and 50 tons. Maximum stroke is 18 in. Vertical opening is 30 in. Vol. 84, p. 181.



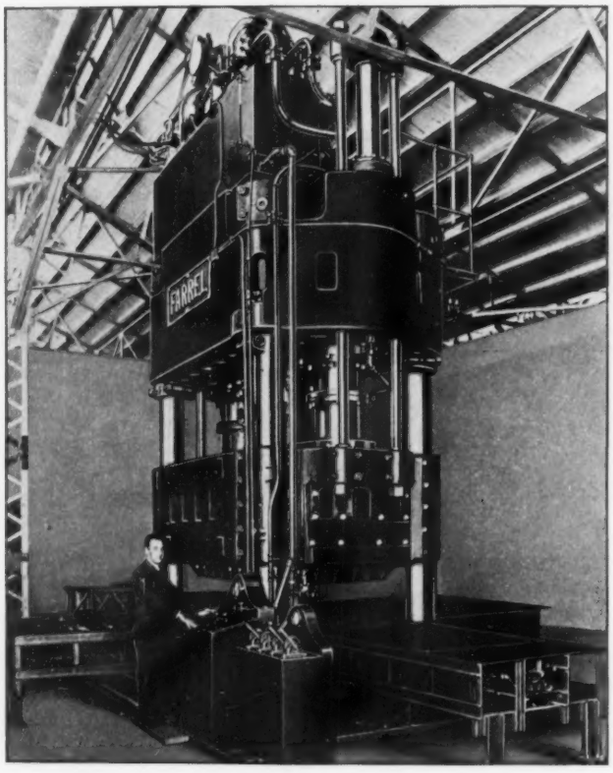
HYDRAULIC PRESS—*Greenerd Arbor Press Co., P. O. Box 415, Nashua, N. H.* This self-contained 10-ton hydraulic press can be equipped with a 10-hp. motor to give a constant ram speed under full pressure of 208 in. per min., with a return speed of 280 in. per min. It will receive parts 15 in. in diameter with a height of 16 in. over the plate. Ram movement is 16 in. Vol. 84, p. 29.

HYDRAULIC PRESS—*Hydraulic Press Mfg. Co., Mt. Gilead, Ohio.* Using a 3-in. working stroke, the press shown can be used for 47 cycles per minute. Pressure can be built up on the solid bed to 250 tons. Pressing surface advances by gravity. No operating valves are used between pressure pump and cylinders. Vol. 84, p. 308.

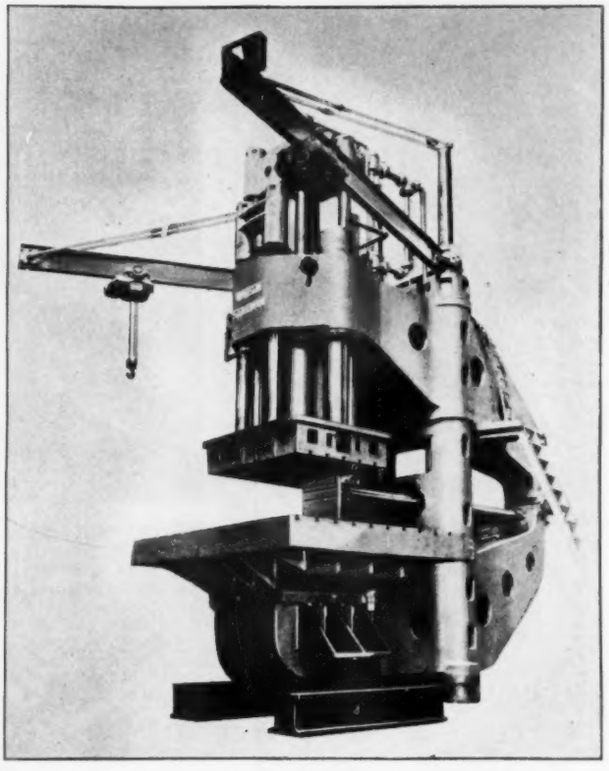




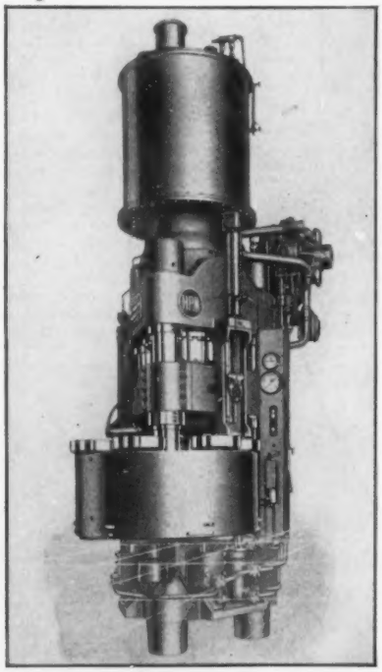
PRESSES, FORGING and MOLDING MACHINES—Hydraulic Presses



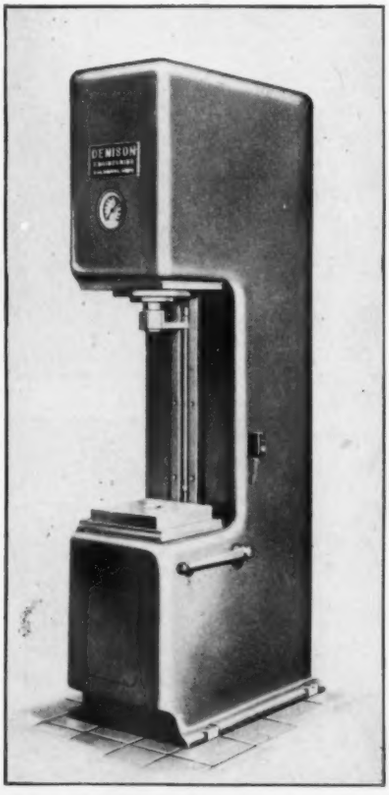
HYDRAULIC PRESS—*Farrel-Birmingham Co., Inc., Ansonia, Conn.* A feature of this 2200-ton hydraulic press for forming aircraft parts is the conveyor tables located on four sides of the press for loading and unloading. These tables are equipped with movable platens on which dies are mounted and carried into and out of the press. Maximum capacity is 2200 tons under 2500 lb. pressure. Press has a 60-in. opening and a 36-in. stroke. Closing speed is variable from 1 to 130 in. per min., with a pressing speed of from 1 to 12 in. per min. Machine is driven by a 150-hp. motor. Vol. 84, p. 550.



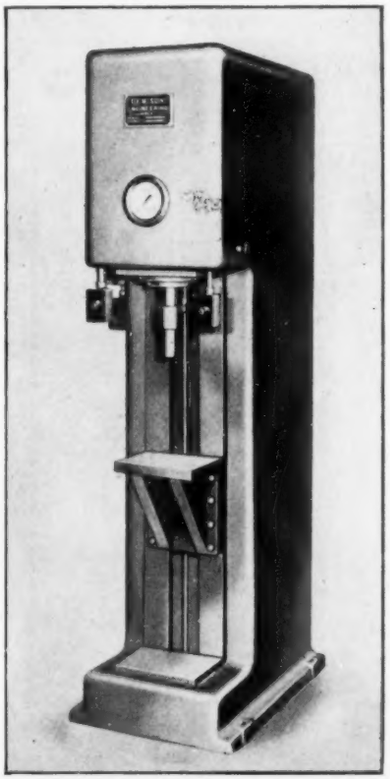
HYDRAULIC FLANGING PRESS—*Watson-Stillman Co., Roselle, N. J.* Designed so that the work is readily and conveniently accessible, this hydraulic flanging press is of overhung gap type construction. Of 1,500 metric tons rated capacity, it has three single-acting moving-down cylinders, one of 1,000 tons capacity and two of 250 tons. Stroke of the main cylinders is 59 in., that of the horizontal cylinder, 79 in. Vol. 84, p. 68.



HYDRAULIC PRESS — *Hydraulic Press Mfg. Co., Mt. Gilead, Ohio.* This turret-type cartridge case heading press is of standard "Fastraverse" design, but has three strain rods instead of four. Press platen is fitted with an air-operated sliding tool holder to accommodate two heading tools. Maximum tonnages range from 500 to 3,000. This range will accommodate shell sizes from 37 to 155 mm. Vol. 84, p. 107.

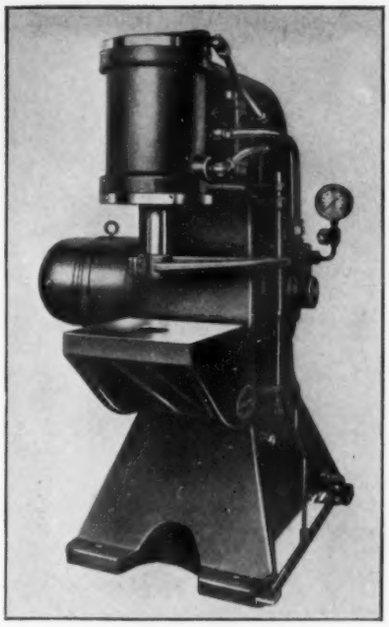


HYDRAULIC PRESS—*Denison Engineering Co., 236 N. Water St., Columbus, Ohio.* Type DLAC2 general-purpose hydraulic press, in 5, 15, 25 or 50 tons capacity, is adaptable for assembling, straightening and production pressing. Vol. 84, p. 942.

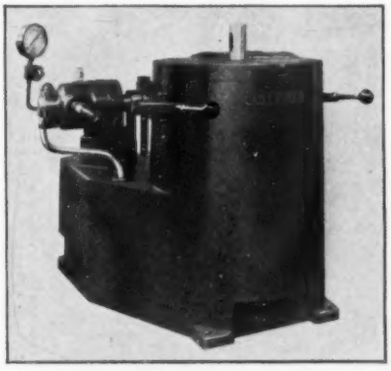


HYDRAULIC PRESS—*Denison Engineering Co., 236 N. Water Street, Columbus, Ohio.* Type DLKC2 hydraulic press facilitates rapid change of tools and fixtures. Suitable for general production pressing, it can be quickly retooled with a variety of bolsters, supports or special fixtures. Furnished in 5- and 15-ton capacities, for manual or electric control. Vol. 84, p. 594.

PRESSES, FORGING and MOLDING MACHINES



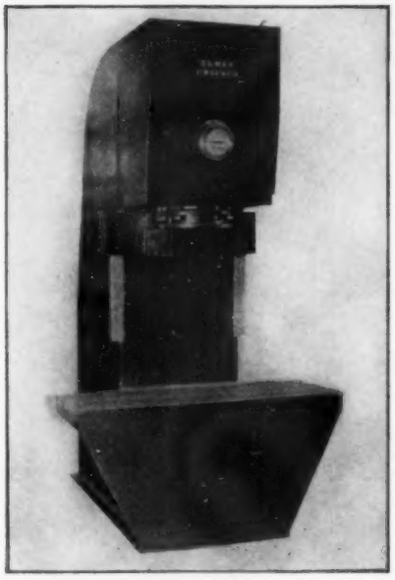
HYDRAULIC PRESS—*Greenerd Arbor Press Co., P. O. Box No. 415, Nashua, N.H.* No. H-70 hydraulic press has pressure variable from 6 to 30 tons. Table is 18 in. wide and 15 in. deep. Machine receives work up to 22 in. diameters; height over work table is 14 in. Stroke is adjustable from 1 to 10 in. Vol. 84, p. 1036.



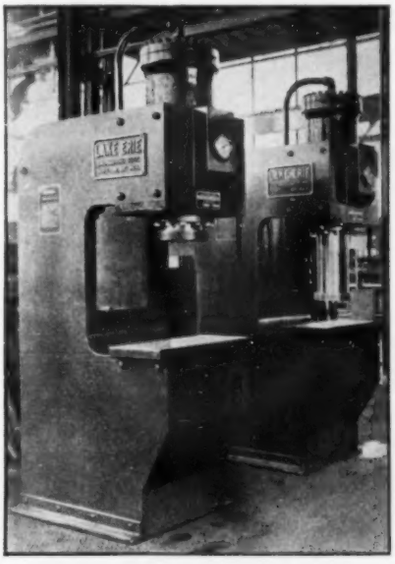
PULL PRESS—*Greenerd Arbor Press Co., P.O. Box No. 415, Nashua, N.H.* No. H 70 P 30-ton pull type press has a 24-in. working table 34 in. above the floor. Ram travel is 17 in. Rapid traverse speed is 138 in. per min.; working speed at 15 to 30 tons pressure is 38 in. per min. Vol. 84, p. 1035.

PUNCH UNIT—*Progressive Welder Co., 3001 E. Outer Drive, Detroit, Mich.* Group of units mounted on a radial fixture punches 16 holes simultaneously in a ⅛-in. steel disk. Vol. 84, p. 551.

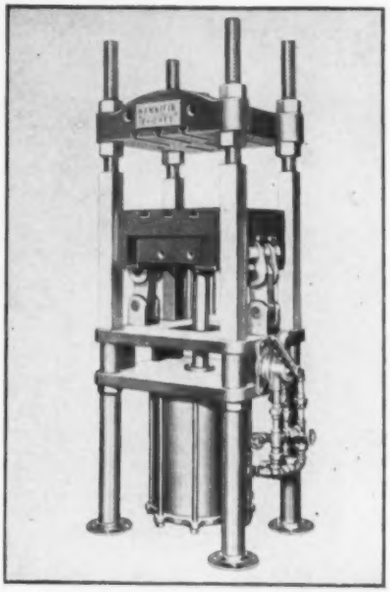
EXTRUSION PRESS — *Farrel-Birmingham Co., Ansonia, Conn.* This 2,000-ton hydraulic press extrudes stainless steel, nickel alloy and ferrous rods, tubing and shapes, that do not work well by rolling, welding or piercing. Vol. 84, p. 687.



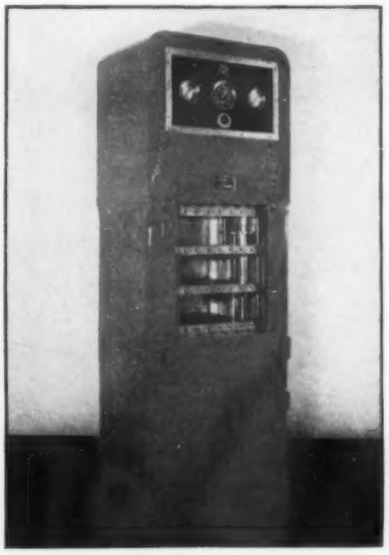
HYDRAULIC PRESS—*Charles F. Elmes Engineering Works, Morgan & Fulton Sts., Chicago, Ill.* This general-purpose, open-side hydraulic press is of steel construction with the frame reinforced for maximum rigidity. Control equipment is located within the housing. Operation is by a single lever. Vol. 84, p. 225.



STRAIGHTENING PRESS — *Lake Erie Engineering Corp., 288 Perry St., Buffalo, N. Y.* Hydraulic straightening presses shown are rated at 66 tons. Stroke is 16 in. Operating speeds are 55 in. per min. when closing, 31 in. per min. when pressing, and 70 in. per min. return. Vol. 84, p.. 349.

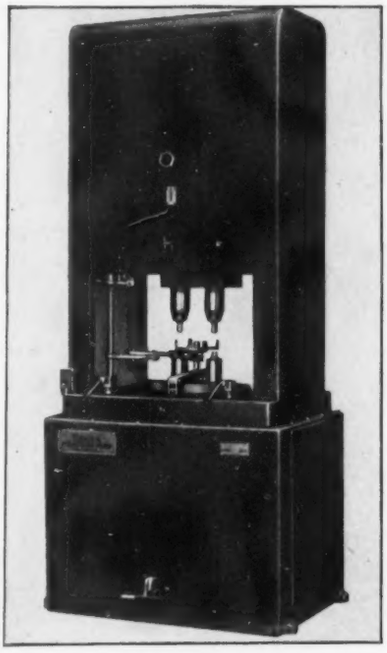


MOLDING PRESS—*Hannifin Mfg. Co., 621 S. Kolmar Ave., Chicago, Ill.* This 50-ton plastic molding press is air-operated, requiring about 80 lb. pressure to develop 50 tons. To accommodate various size dies, strain head is adjustable. Platen stroke is 8 in. Distance between columns is 22 in. Vol. 84, p. 108.

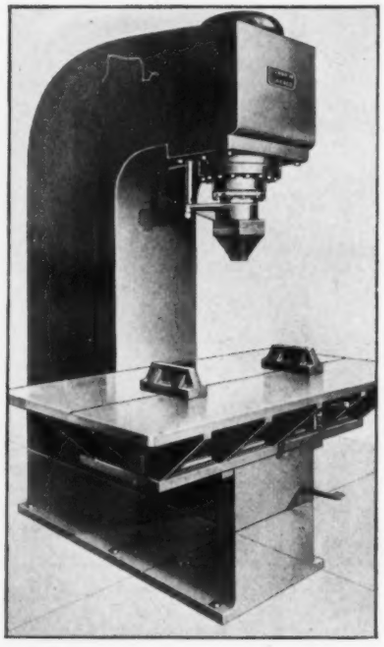


MOLDING PRESS—*Farrel-Birmingham Co., Ansonia, Conn.* This 20x20-in. hydraulic press has been developed for molding small rubber and plastics articles. It operates with an initial water pressure of 2,000 lb. per sq.in., giving a total pressure of 113 tons. Vol. 84, p. 345.

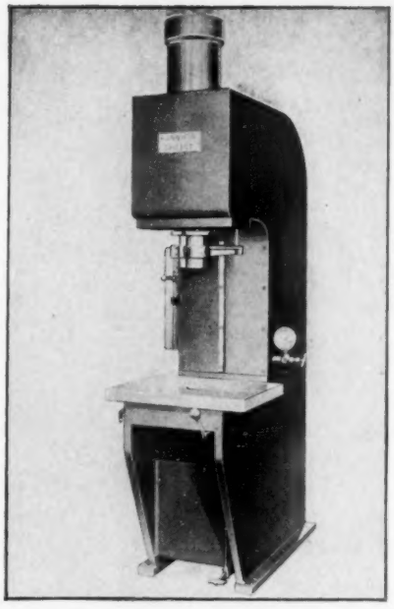
PRESSES, FORGING and MOLDING MACHINES



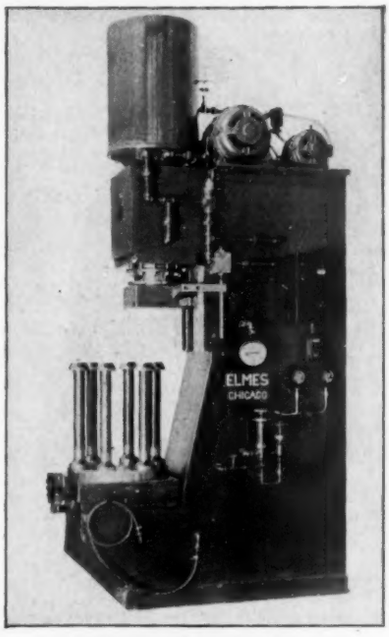
RIVETING PRESS—*Hanna Engineering Works, 1765 Elston Ave., Chicago, Ill.* These electric-hydraulic riveting presses occupy minimum floor space. Available in capacities from 10 to 100 tons, they have motor, pump, controls, piping, cylinder and reservoir totally inclosed. Vol. 84, p. 848.



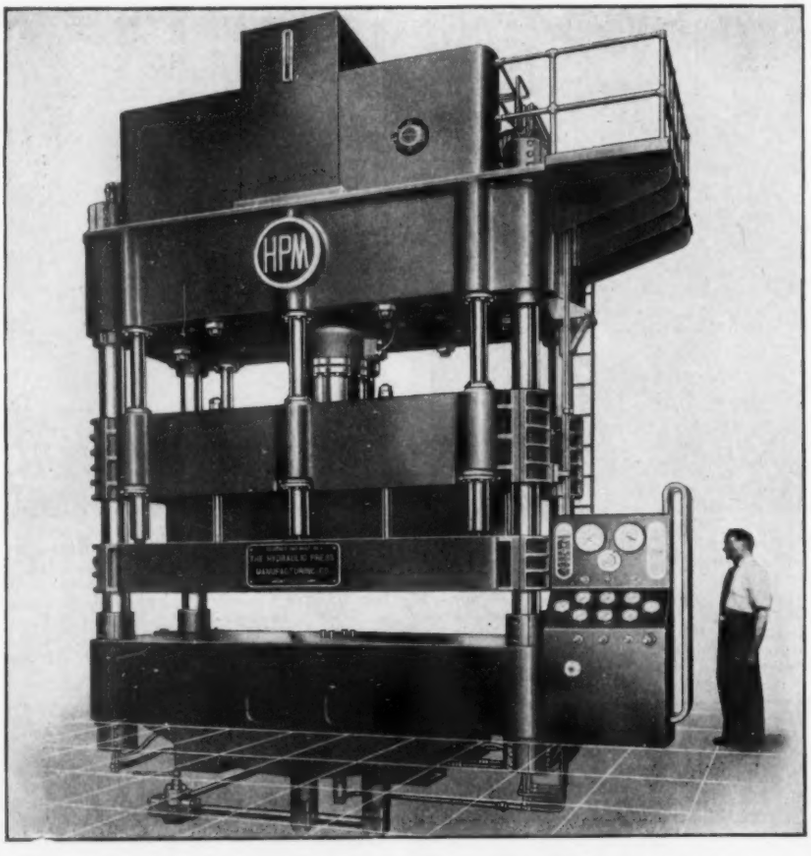
STRAIGHTENING PRESS—*Hannifin Mfg. Co., 621–631 S. Kolmar Ave., Chicago, Ill.* This 150-ton straightening press incorporates sensitive pressure control. Dimensions: stroke, 20 in.; gap, 30 in.; reach, 30 in. Table measures approximately 54x96 in. Vol. 84, p. 1097.



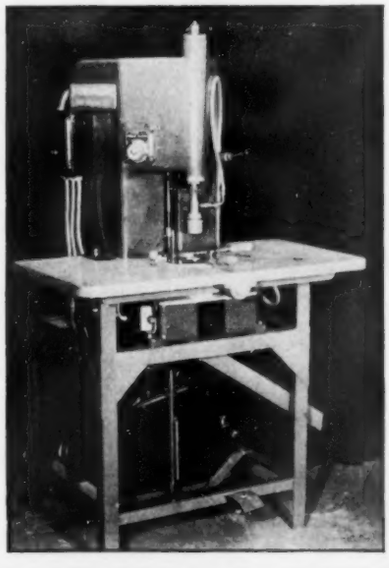
FORCING PRESS—*Hannifin Mfg. Co., 621-631 S. Kolmar Ave., Chicago, Ill.* This 25-ton hydraulic forcing press has 24-in. stroke. Vol. 84, p. 310.



MARKING PRESS—*Charles F. Elmes Engineering Works, Morgan & Fulton Sts., Chicago, Ill.* Automatic 15–100 ton hydraulic marking press permits 20 markings per min. Vol. 84, p. 31.

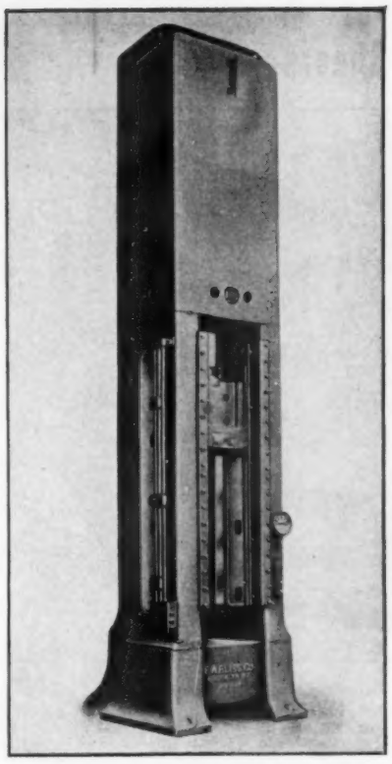


BLANKHOLDER PRESS—*Hydraulic Press Mfg. Co., 20 E. Broad St., Columbus, Ohio.* This 650-ton triple-action blankholder press is designed especially for deep drawing gasoline tanks and other similar parts for the aircraft industry. Pressures are 650 tons on the main platen, 250 tons on the blankholder, and 133 tons on the die cushion. Pressing surfaces are 144x72, 144x72 and 59x35 in. respectively. Power is furnished by a 100-hp. motor. Vol. 84, p. 776.



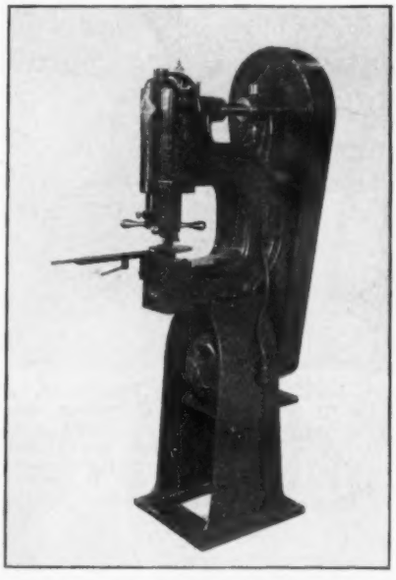
PLASTIC DRAWING PRESSES—*Taber Instrument Co., North Tonawanda, N. Y.* Hydraulic and mechanical presses are equipped with special tooling for deep drawing sheet plastics. Objects up to 3 in. diameter can readily be made with a ½-ton hand press having a 6-in. stroke, while larger articles are produced on the hydraulic press illustrated. This press has a 10-in. stroke, a ram speed of from 30 to 60 in. per min., and is capable of a sustained production of 600 pieces per hour. Vol. 84, p. 993.

PRESSES, FORGING and MOLDING MACHINES



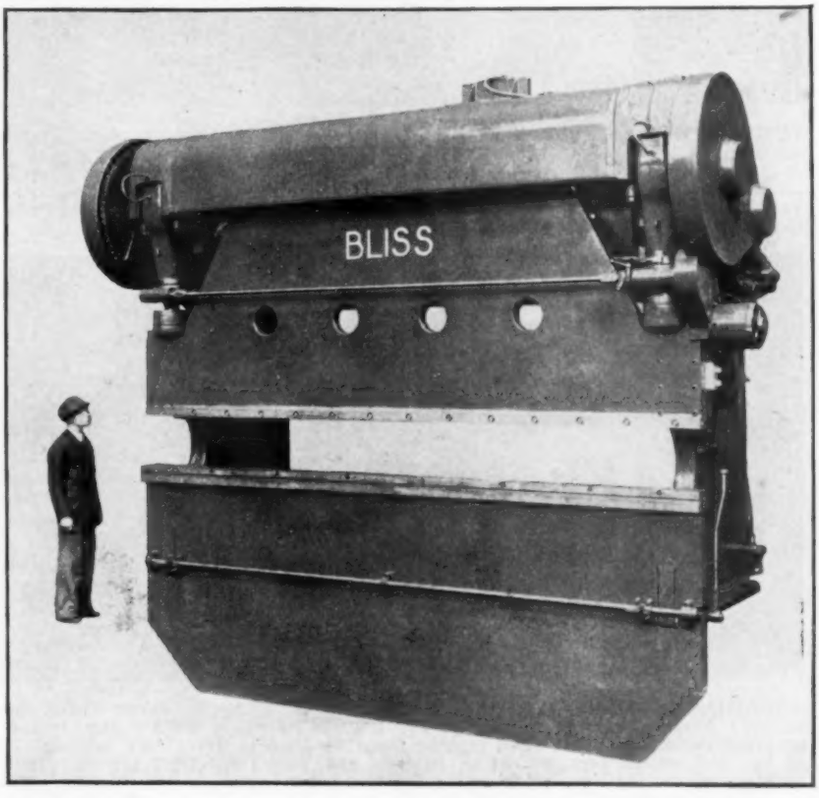
CARTRIDGE CASE PRESS—*E. W. Bliss Co., 53rd St. & 2nd Ave., Brooklyn, N.Y.* The 100-ton "Hydro-Dynamic" press has been developed especially for redrawing cartridge cases. This fast, single-action, self-contained press incorporates all-electric control as well as a direct pumping unit. Has rigid four-piece tie-rod frame construction, with keyed and fitted sections of high-test iron. Maximum stroke is 84 in. Bed area is 30x31 in. Vol. 84, p. 477.

PRESS BRAKE—*Cincinnati Shaper Co., Cincinnati, Ohio.* This Series 340 all-steel press brake is said to be the largest ever built for the aircraft industry. It is arranged for corrugating and forming aluminum alloys. Housings, bed and ram are of rolled steel plate. Distance between housings is 18 ft. 6 in.; total over-all die surface is 21 ft. 3 in. It is equipped with taper adjustment to the ram, air counterbalances, tonnage load indicator, electric clutch control, and automatic electric overload clutch release. Deflection is claimed to be practically eliminated by massive construction. Vol. 84, p. 311.

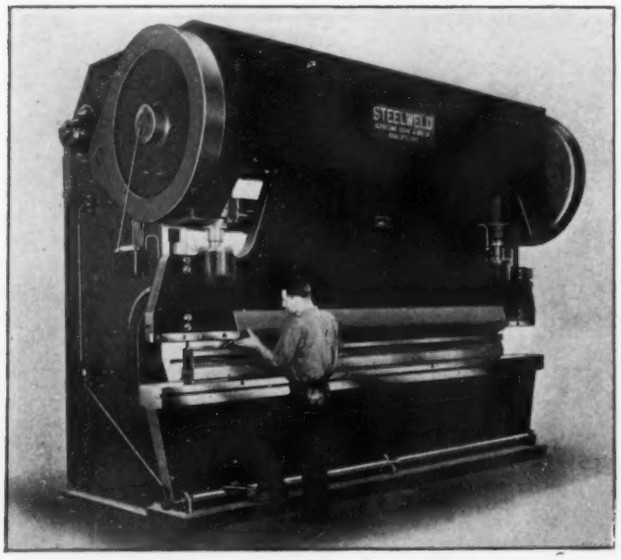


NIBBLERS—*W. J. Savage Co., Knoxville, Tenn.* Improved nibbling machines employ direct over-center drive and totally inclosed revolving head. Fast and accurate cutting of sheets from 0 to ½ in. thick is accomplished. Stainless and other alloy steels, aluminum, brass, and copper can be cut. Machines have capacities in mild steel up to ⅞ in. with throat depths of 9, 12, 18, 30, 34 and 36 in. Vol. 84, p. 392.

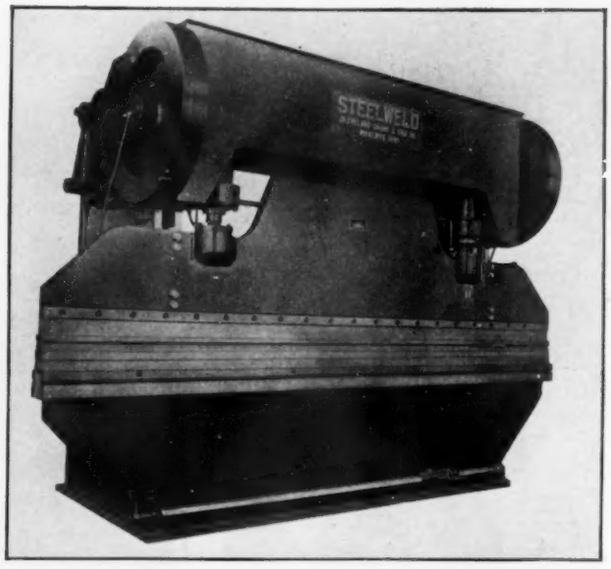
PRESS BRAKE—*E. W. Bliss Co., 53rd St. & Second Ave., Brooklyn, N.Y.* No. E-12 all-steel press brake has a capacity of ¼x144 in. in mild steel. Electrically operated friction clutch and V-belt drive are used. Specifications: distance between housings, 150 in.; gap depth, 12 in.; stroke, 3 in.; speed, 30 strokes per min. Vol. 84, p. 553.



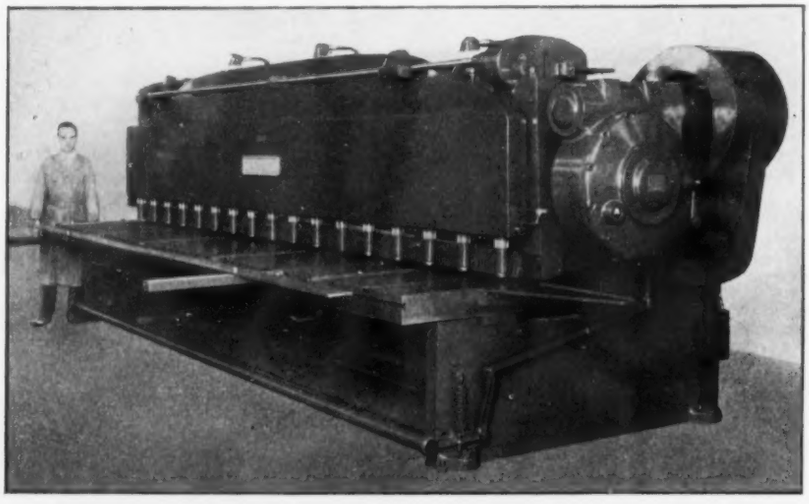
PRESSES, FORGING and MOLDING MACHINES—Brakes, Shears



PRESS BRAKE—*Steelweld Machinery Div., Cleveland Crane & Engineering Co., Wickliffe, Ohio.* Model J-12 "Steelweld" press brake will handle plate 144x½ in. between housings and up to 14 ft. over the total length of the bed and ram. It has a one-piece all-welded frame, and may be used for bending, forming, blanking, drawing, rubber-forming and multiple-punching. Vol. 84, p. 182.

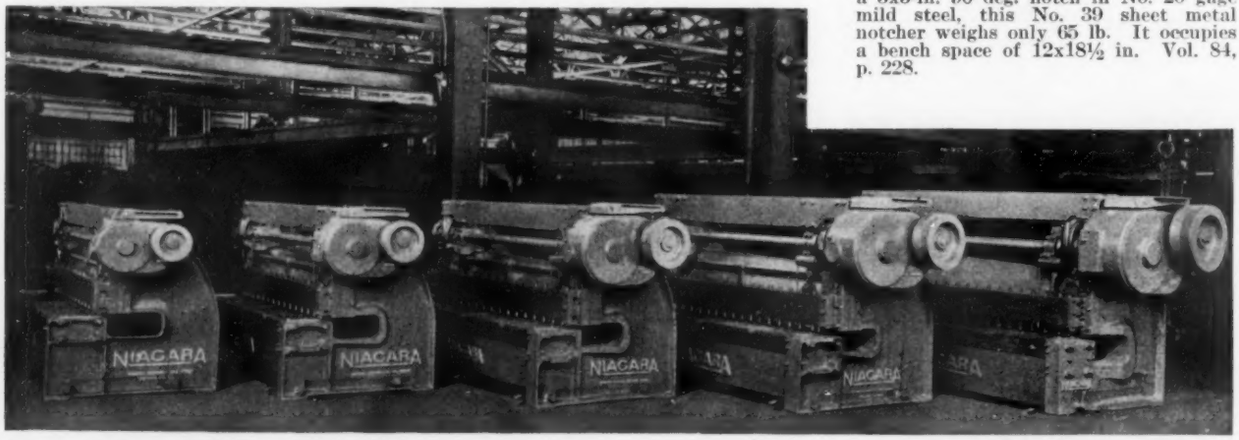


PRESS BRAKES—*Steelweld Machinery Div., Cleveland Crane & Engineering Co., Wickliffe, Ohio.* "Steelweld" press brakes are adaptable for extensions of bed and ram at one or both ends. Illustrated is a Model H-8 brake provided with 2-ft. extensions. This press normally handles 96x$\frac{5}{8}$-in. plate between housings, but extensions make possible forming No. 12 gage plate 14 ft. wide. Vol. 84, p. 439.



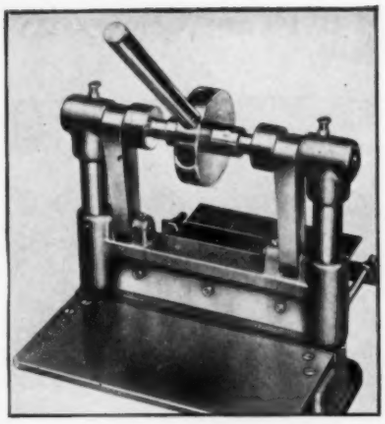
STEEL SHEAR—*Cincinnati Shaper Co., Cincinnati, Ohio.* Series 4316 all-steel shear has a length of 16 ft. and is capable of handling plates up to ⅜ in. thick. A 20-hp. motor is used. Length between housings is 195 in. At a flywheel speed of 800 r.p.m. the shear operates at a speed of 40 strokes per minute. Front gage range is 55 in. and back gage range is 36 in. Normal hold-down pressure is 24 tons. Vol. 84, p. 477.

SHEET METAL NOTCHER—*J. F. Kidder Mfg. Co., 426 Colchester Ave., Burlington, Vt.* Having capacity to cut a 5x5-in. 90 deg. notch in No. 20 gage mild steel, this No. 39 sheet metal notcher weighs only 65 lb. It occupies a bench space of 12x18½ in. Vol. 84, p. 228.

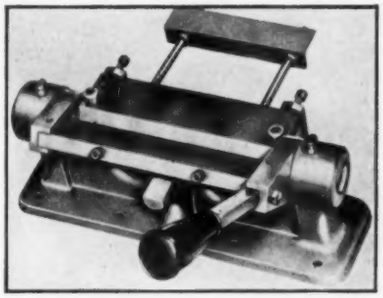


SQUARING SHEARS—*Niagara Machine & Tool Works, 637–697 Northland Ave., Buffalo, N. Y.* A series of power squaring shears is built in sizes ranging from No. 10 gage to ½ in. Convenient arrangement of controls and gages, full visibility of cutting line, quick acting fourteen-point engagement sleeve clutch, and high operating speeds permit more working strokes per hour. Each machine is provided with a ball bearing, self-measuring parallel back gage reading to 1/128 in. Drive mechanism includes built-in single stroke mechanism. Vol. 84, p. 222.

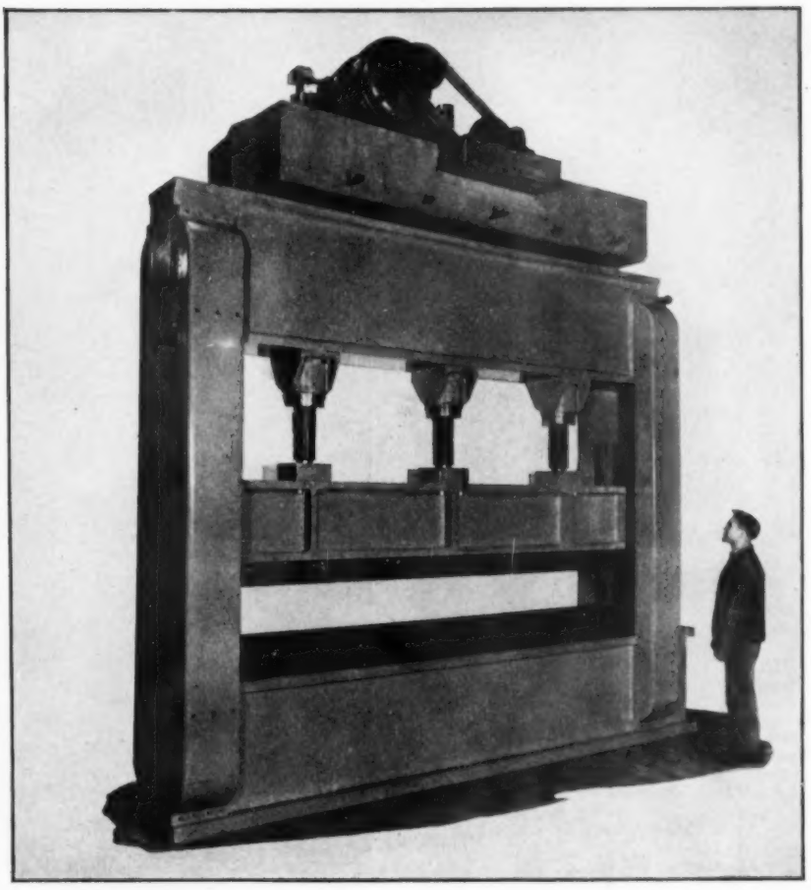
PRESSES, FORGING and MOLDING MACHINES



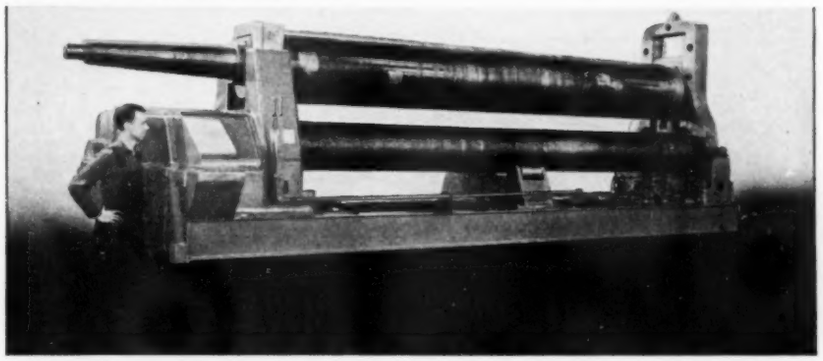
BENCH SHEAR—*O'Neil-Irwin Mfg. Co., 316 Eighth Ave. S., Minneapolis, Minn.* "Micro" bench shear has maximum shearing width of 6¼ in.; maximum shearing capacity is 24 gage steel full width, and 18 gage steel of 1-in. width. Vol. 84, p. 1099.



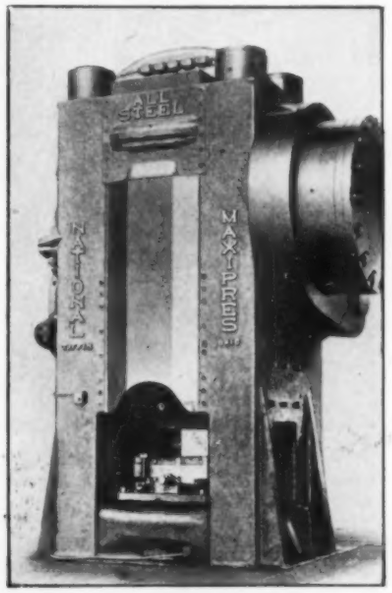
BENCH BRAKE—*O'Neil-Irwin Mfg. Co., 316 Eighth Ave. S., Minneapolis, Minn.* "Micro" bench brake forms angles, brackets, vees and other types of folding to 110 deg. Maximum folding width is 6 in. with 18 gage steel, 4 in. with 16 gage. Vol. 84, p. 1102.



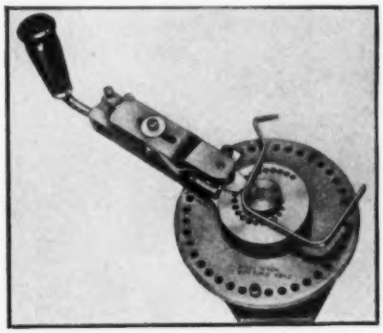
BENDING PRESS—*Contract Engineering Corp., Cleveland, Ohio.* "Bull Press" for bending, forming, straightening, horning and similar operations is built in any capacity to meet requirements for production of welded steel fabricated equipment. Press shown bends a 10-ft. length of ½-in. mild steel plate to a 90-deg. angle on a 6-in. V-die block. Power is supplied by a 25-hp. motor. Vol. 84, p. 263.



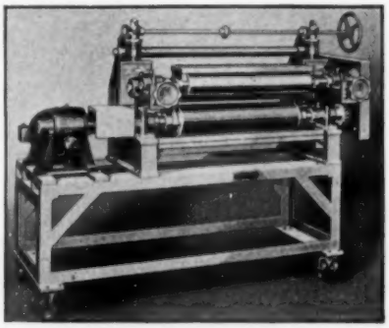
BENDING ROLL—*Baldwin Southwark Div., Baldwin Locomotive Works, Philadelphia, Pa.* This 16-ft. horizontal bending roll provides greater rigidity and better load distribution at the several joints between the drive box, bed rails and inner housing by welding these parts as an integral unit. Either end of the roll can be raised or lowered independently. Vol. 84, p. 1099.



FORGING PRESS—*National Machinery Co., Tiffin, Ohio.* High-speed forging "Maxipreses" are suitable for a great variety of forging work. They are built in six sizes from No. 1½ to No. 6, corresponding in capacity to 800, 1,200, 2,000, 3,500, 5,000 and 6,500 lb. board drop hammers. They have speeds from 130 strokes per min. on the small size to 80 strokes per min. on the large size. Vol. 84, p. 686.

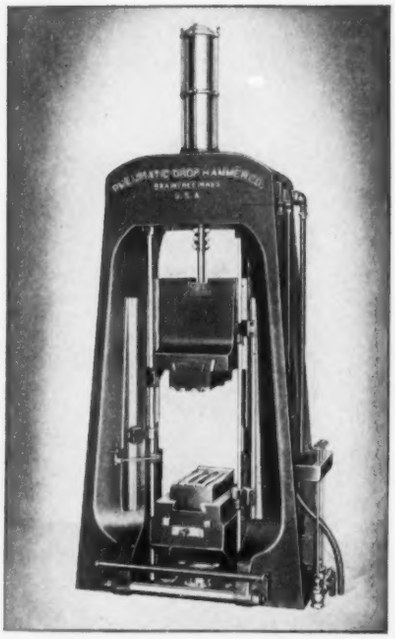


STRIP BENDER—*O'Neil-Irwin Mfg. Co., 316 Eighth Ave. S., Minneapolis, Minn.* "Micro" die duplicating bender forms strips to shapes which are impractical with blanking or forming dies. Work can be held to tolerances not exceeding 0.001 in. Suitable for semi-production work up to 1,000 operations per hour. Vol. 84, p. 1104.

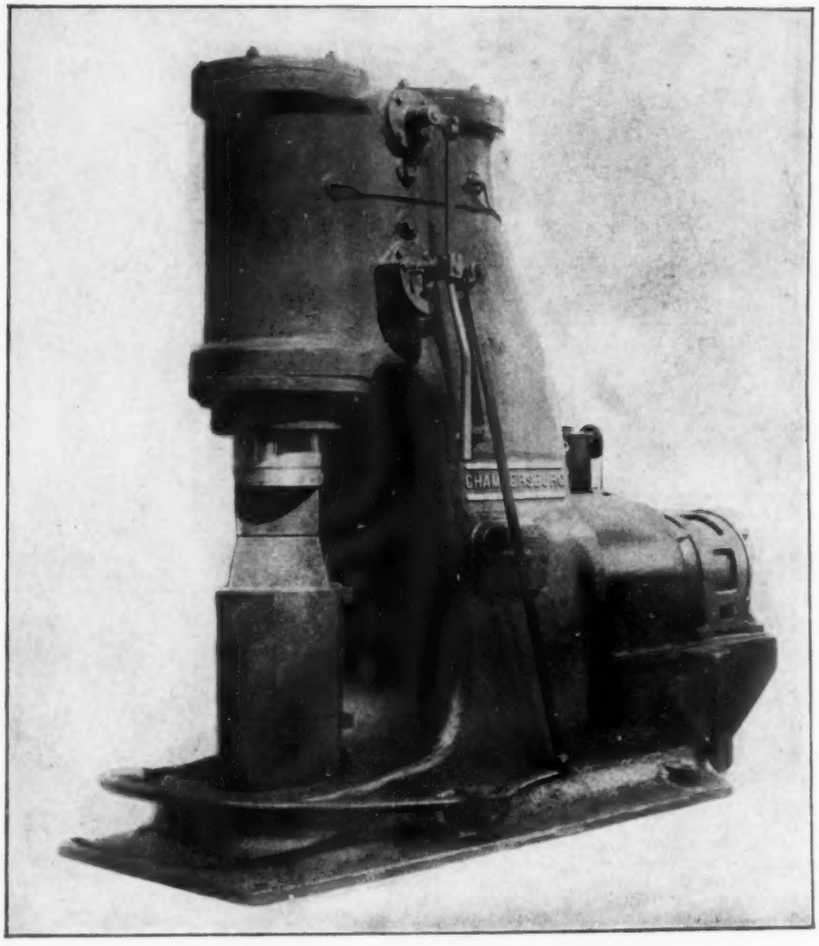


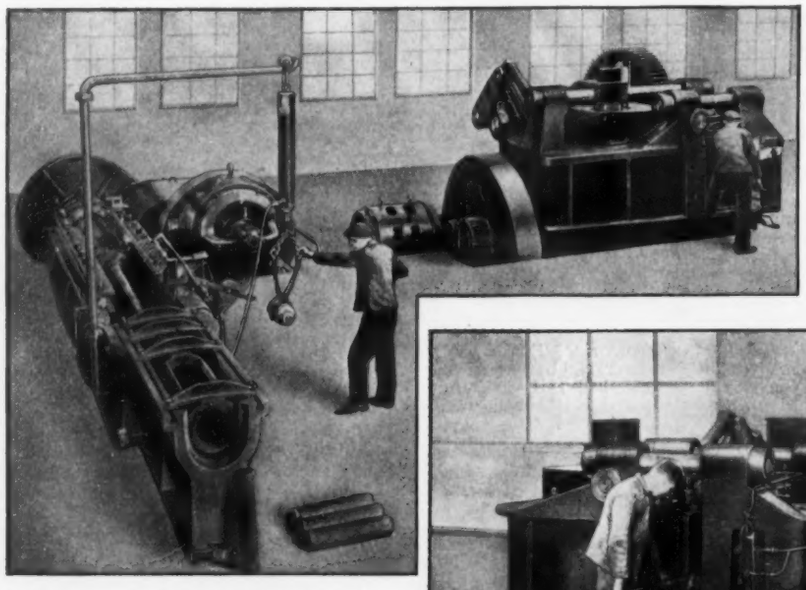
COMPOUND APPLICATOR — *Chas. E. Francis Co., Rushville, Ind.* A machine for applying draw compound to sheets preparatory to shaping or forming includes two corrugated rubber rolls for coating sheets on both sides. Calibrated adjustments govern spread of the compound and spacing of the rolls. Vol. 84, p. 1038.

PRESSES, FORGING and MOLDING MACHINES—Hammers

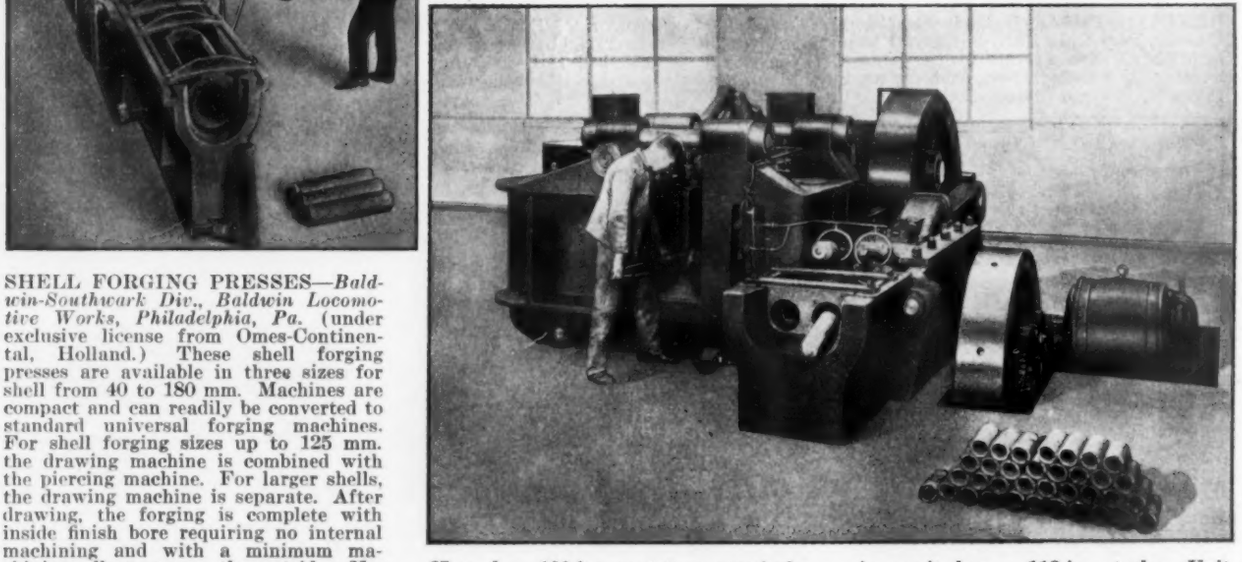


DROP HAMMER—*Pneumatic Drop Hammer Co., 200 Adams St., Braintree, Mass.* This double-action shockless drop forging hammer is claimed to operate without vibration since the opposing heads meet with the same force at impact. The dropping head is lifted by air and dropped by gravity, and, at the proper time in its descent releases the anvil head which is propelled upward to meet it. Stroke adjustments are quickly made. Vol. 84, p. 393.



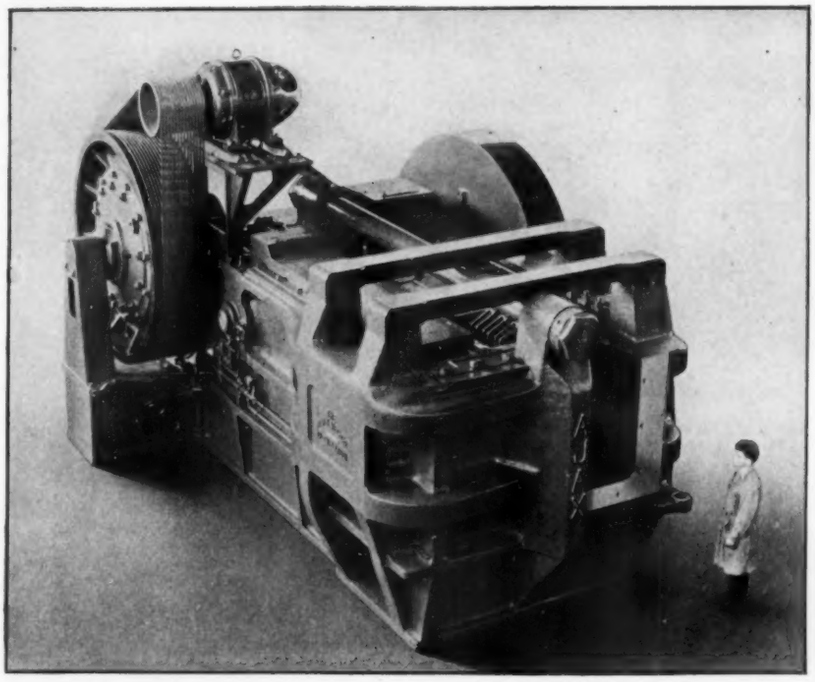


ELECTRO-PNEUMATIC HAMMERS — *Chambersburg Engineering Co., Chambersburg, Pa.* These self-contained electro-pneumatic hammers produce more actual forging per blow because of the heavier anvil construction and the higher impact speeds. Operating economies are secured by anti-friction bearings, elimination of parts, and low center of gravity. Hammers are made in three types: (1) one-piece, rated at 200 and 300 lb.; (2) solid frame, having separate anvils and a one-piece frame, in sizes up to 500 lb.; (3) two-piece frame, in sizes over 750 lb. Vol. 84, p. 181.

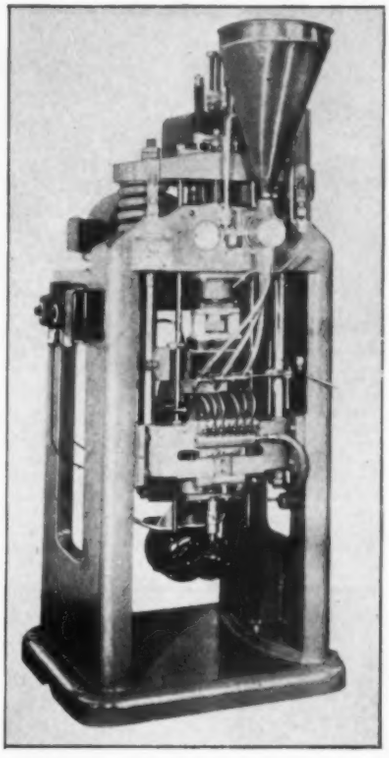


SHELL FORGING PRESSES—*Baldwin-Southwark Div., Baldwin Locomotive Works, Philadelphia, Pa.* (under exclusive license from Omes-Continental, Holland.) These shell forging presses are available in three sizes for shell from 40 to 180 mm. Machines are compact and can readily be converted to standard universal forging machines. For shell forging sizes up to 125 mm. the drawing machine is combined with the piercing machine. For larger shells, the drawing machine is separate. After drawing, the forging is complete with inside finish bore requiring no internal machining and with a minimum machining allowance on the outside. No. CM-35 unit is used for shell from 40 to 75 mm. No. CM-50 unit is for sizes from 75 to 125 mm. They require an 85 and a 120-hp. motor, respectively. PM-75-DP20 unit is for shell forgings from 125 to 180 mm. 750-ton piercing unit has a 14-in. stroke. 200-ton drawing unit has a 118-in. stroke. Units have 150 and 120 hp. motors, respectively. 40 mm. shell production is more than 200–250 per hr. Vol. 84, p. 518.

Die Casters—PRESSES, FORGING and MOLDING MACHINES

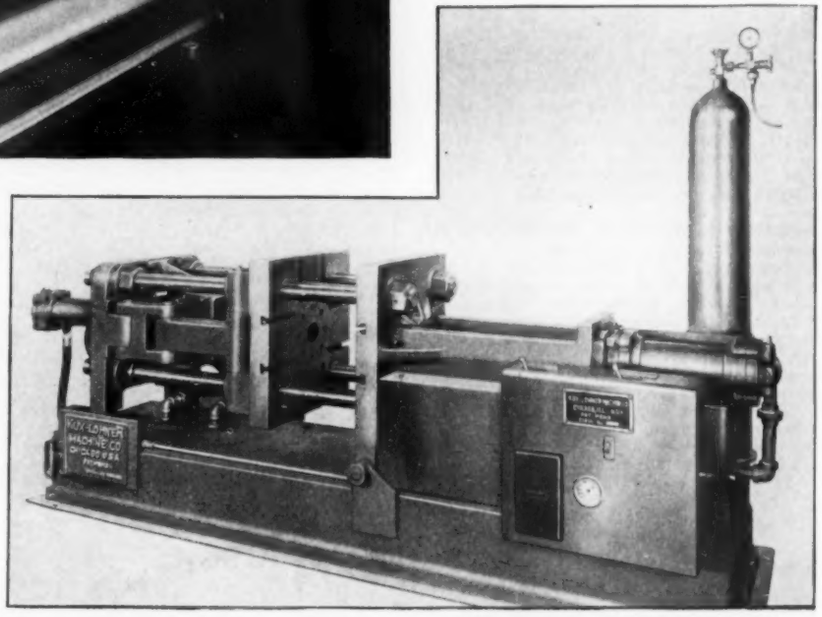


UPSETTING MACHINE—*Ajax Mfg. Co., Chardon Rd., Cleveland Ohio.* Weighing 470,000 lb., this 8-in. upsetting and forging machine has a one-piece integral frame without joint between crankshaft and dies. Machine is built to accommodate dies 46 in. high, so that dies with as many as four progressive operations for fabricating heavy forgings can be handled entirely within the die seat. It is driven by a 150-hp. motor through V-belts to a flywheel and air clutch. Vol. 84, p. 312.



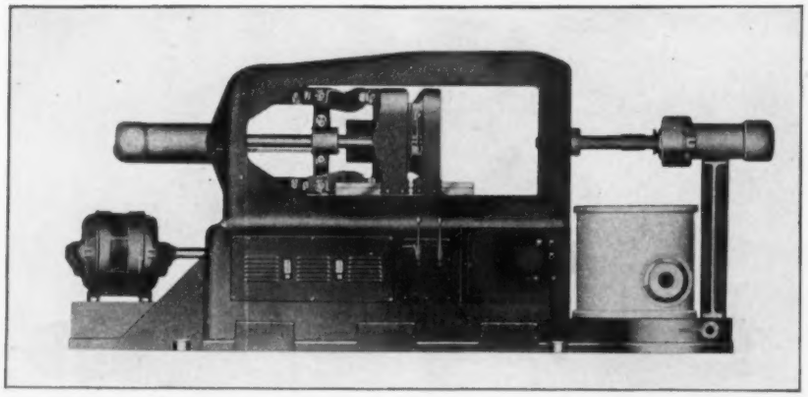
PLASTIC MOLDING MACHINE—*F. J. Stokes Machine Co., 5930 Tabor Rd., Philadelphia, Pa.* An unscrewing device built into this molding press permits threaded plastic parts to be produced in a completely automatic operation at production rates of over 1,000 per mold cavity per day. Vol. 84, p. 686.

DIE-CASTING MACHINE—*Madison-Kipp Corp., Madison, Wis.* Model No. 500 "Giant Kippcaster" die-casts zinc alloys. Machine stroke is 8½ in. with standard cylinders and plungers. Over 1,800 lb. pressure is exerted with 100 lb. air pressure. Gooseneck with standard plunger shoots a 3½ lb. casting. Length of the machine is 8 ft. 1 in., width is 3 ft. 8 in., height is 6 ft. 2 in. Vol. 84, p. 893.



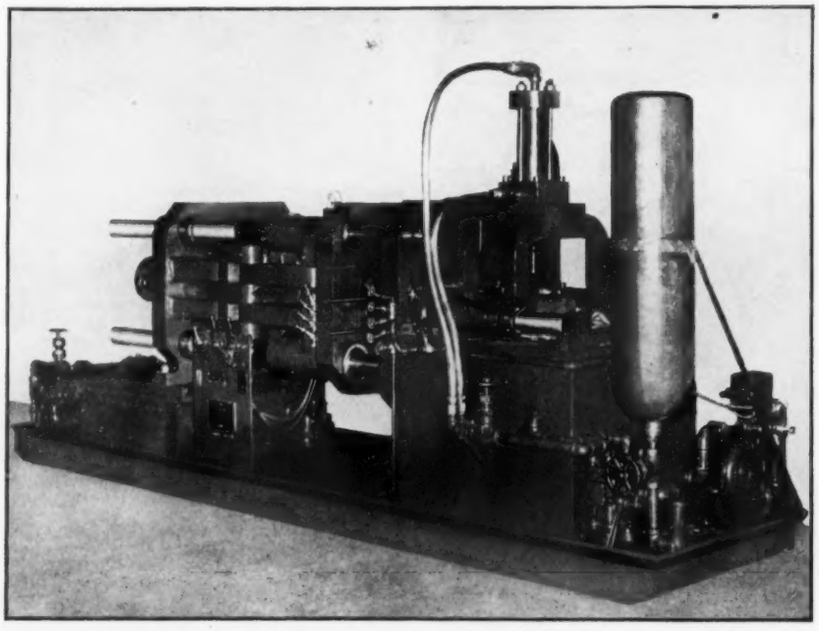
DIE CASTER—*Kux-Lohner Machine Co., 2145–47 Lexington St., Chicago, Ill.* Built in two sizes, these machines are of the hand-ladling type in which molten brass or aluminum is injected into the die under pressures up to 10,000 lb. per sq.in. On the Model HP-12 machine, die space between bars is 12 in. square. On the No. HP-18 model, die space is 18 in. square. Castings weighing up to 7 lb. in brass and 2½ lb. in aluminum can be made. Vol. 84, p. 998.

PRESSES, FORGING and MOLDING MACHINES—Die Casters

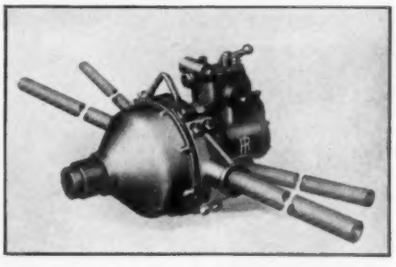


DIE CASTING MACHINES—*Lester Engineering Co. and Phoenix Machine Co., 2701–2711 Church Ave., Cleveland, Ohio.* Models HHP-2X and HHP-3X die casting machines handle aluminum, brass and magnesium alloys. They produce castings up to 2.2 lb. of aluminum and 6 lb. of brass and 3.3 lb. of aluminum and 9 lb. of brass, respectively. Changing pot and injection plunger adapts them to zinc, tin, and lead alloys. Positive mold-locking up to 800,000 lb. is attained. Speed of injection plunger and pressure on metal are variable. Sequence of operation is electrically controlled, as is timing of each operation. Vol. 84, p. 478.

PLASTIC MOLDING MACHINE—*Watson-Stillman Co., Roselle, N. J.* This 50-ton fully automatic hydraulic compression molding machine molds thermosetting materials, as well as thermoplastics. Die plates measure 10 in. top to bottom, 18 in. front to back, 10 in. right to left. Maximum vertical opening is 23 in. and horizontal opening between plates is 22 in. Stroke of vertical and horizontal rams is 12 in. Steam-heated die plates are standard. Vol. 84, p. 261.

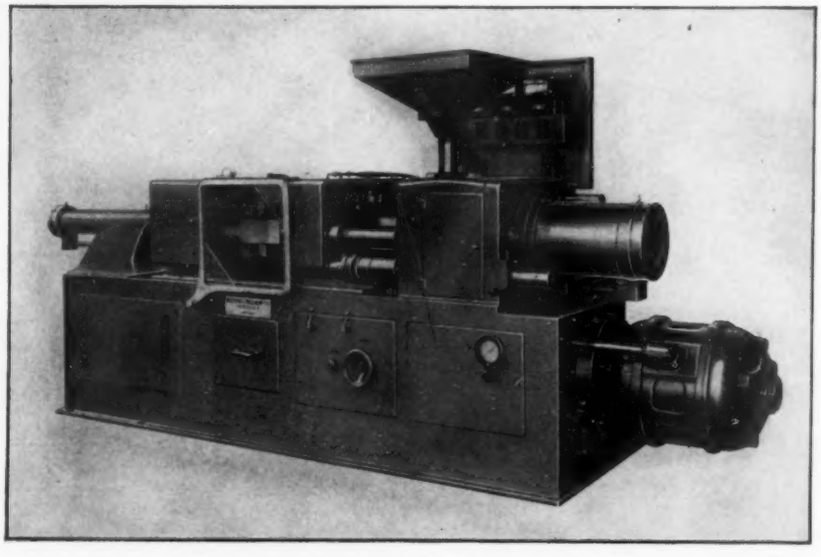


HYDRAULIC DIE CASTERS—*G & M Mfg. Co., Cleveland, Ohio.* Available are two improved high-pressure hydraulic die-casting machines, one for zinc, tin and lead-base alloys, and the other for aluminum, brass and magnesium alloys. Base, framework, die plates and toggle links are of steel plates. Toggle arrangement permits moving and locking die plate with hydraulic pressure of less than 300 lb., providing locking pressure of 500,000 lb. All hydraulic regulating valves have been placed on the operator's side. Connections are oxy-acetylene welded to prevent leakage. Vol. 84, p. 347.

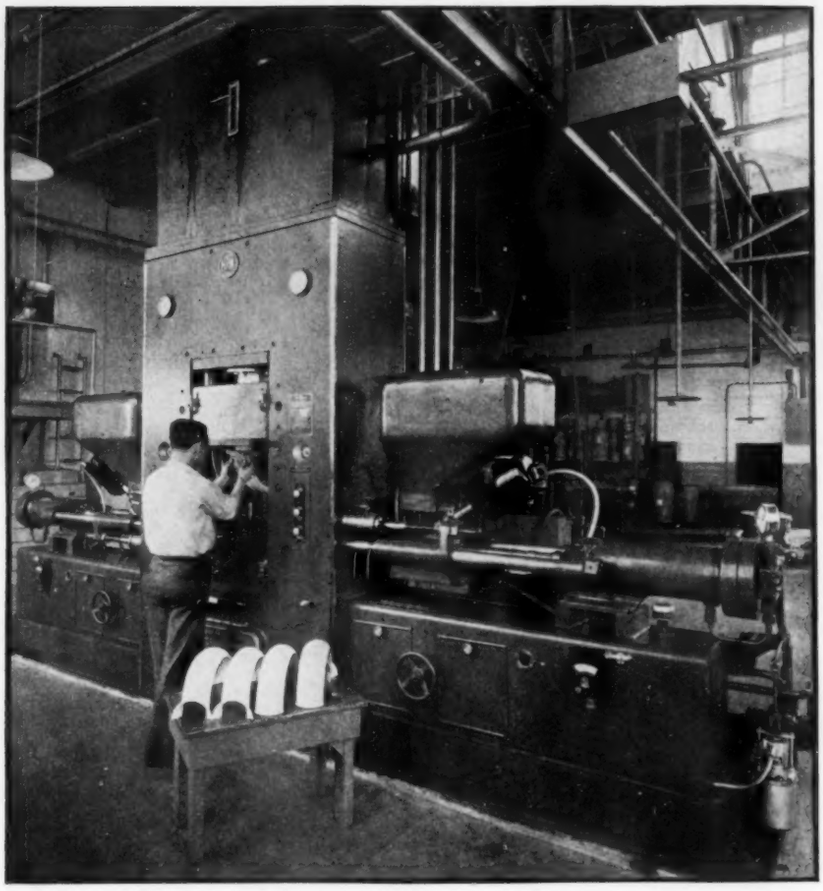


FLUE ROLLING MACHINES—*Ingersoll-Rand Co., Phillipsburg, N. J.* Nos. 55-Q and 55-R flue rolling machines are powered by "Multi-Vane" air motors. Working speeds are very low, with correspondingly high torques. Size 55-Q has an average working speed of 32 r.p.m., Size 55-R, 20 r.p.m. Vol. 84, p. 1104.

INJECTION MOLDING MACHINE—*Watson-Stillman Co., Roselle, N. J.* Feature of No. 8-A hydraulic injection molding machine is zone heat control, giving greater plasticizing capacity. 24-in. opening between die plates, with 18 in. adjustment on clamping end, allows accommodation of dies 6 in. thick. Maximum weight of material injected per cycle with 2 3/16-in. cylinder is 6 oz. at 50,000 lb. per sq.in. With 2¾-in. cylinder, weight is 8 oz. at 32,000 lb. per sq.in. Stroke of injection plunger is 9 in. Vol. 84, p. 184.



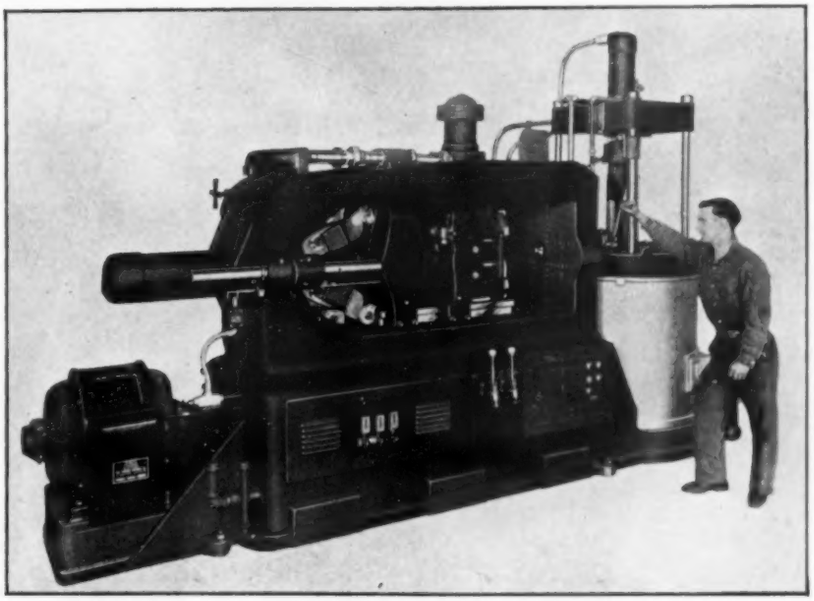
Miscellaneous—PRESSES, FORGING and MOLDING MACHINES



COIL WINDER DRIVE—*Ideal Commutator Dresser Co., 1057 Park Ave., Sycamore, Ill.* Model 210 foot-controlled coil winder drive provides an infinite number of driving speeds between 120 and 650 r.p.m. Vol. 84, p. 112.

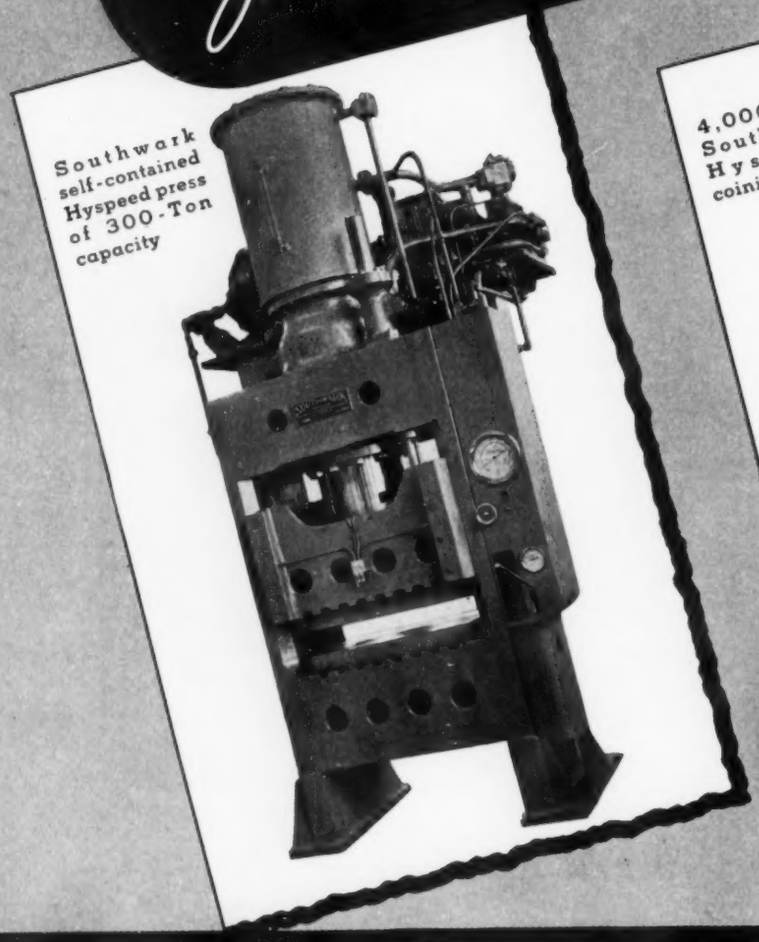
DIE CASTER—*Phoenix Machine Co., 2703 Church Ave., Cleveland, Ohio.* Model HHP-3 die casting machine is so designed that zinc, aluminum, brass or magnesium may be cast by interchanging pots and injection plungers. All pressure is supplied by direct-driven pumps, eliminating accumulator bottles. Plunger speed and pressure are controllable. Operation is controlled either automatically or manually. Vol. 84, p. 69.

INJECTION MOLDING PRESS—*Hydraulic Press Mfg. Co., Mount Gilead, Ohio.* Model 250-V-double-9 18-oz. vertical injection molding press incorporates two complete injection units, one on each side of the downward-acting clamp press. Each is hydraulically synchronized with the movements of the press. Each injection unit has a capacity of 9 oz. per shot. H-P-M variable-volume radial pump provides a constant pressure against clamp ram with minimum power consumption. Specifications: vertical clamp pressure, 250 tons; maximum mold size, 24x24 in.; pressure per sq. in. on material in injection chamber, 20,000 lb.; cycles per minute, 3 to 5. Vol. 84, p. 348.

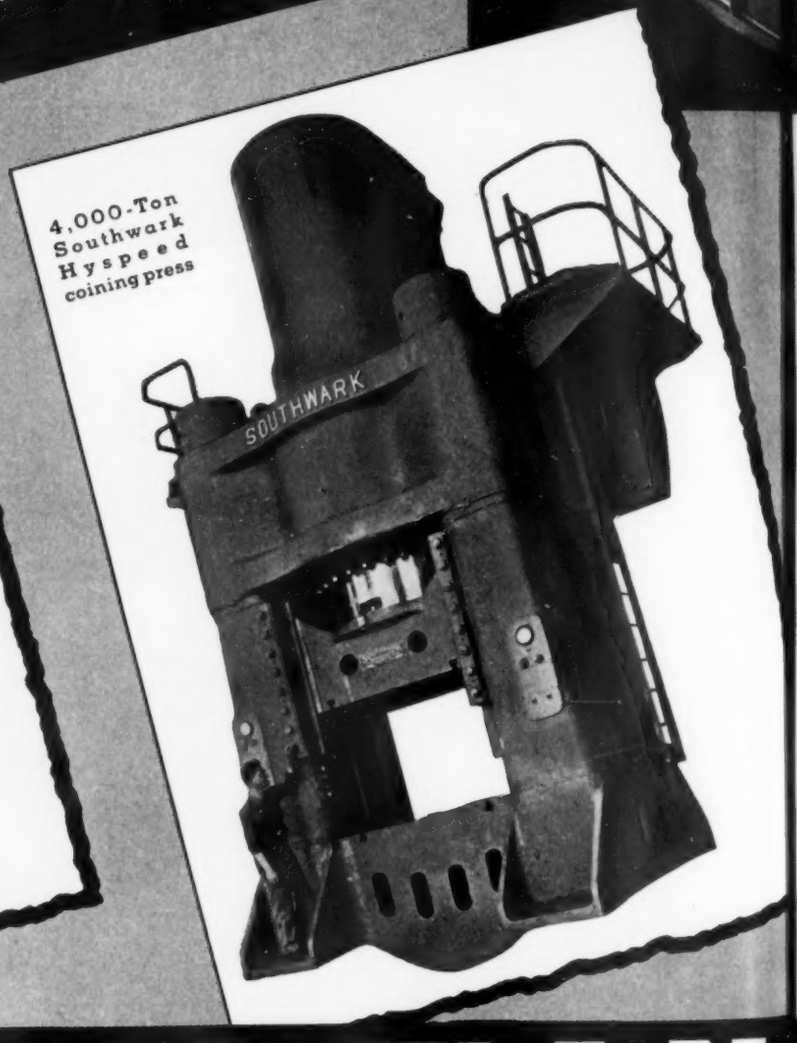


HYDRAULIC & POWER TOOL EQUIPMENT..

for the Metal Working Industries



Southwark self-contained Hyspeed press of 300-Ton capacity



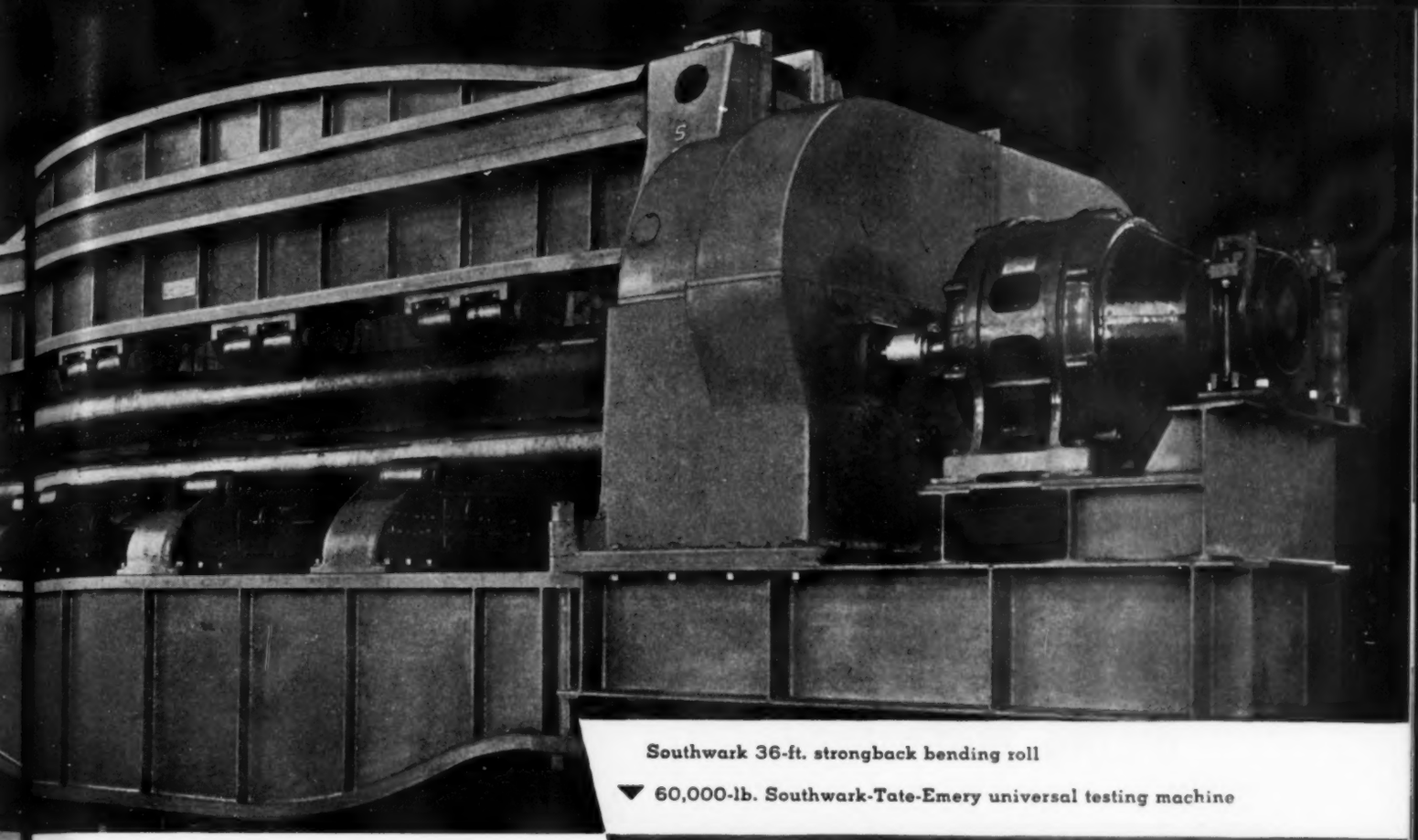
4,000-Ton Southwark Hyspeed coining press

Whet
equi
dut
wo
s

THE BALDWIN GROUP

BALDWIN

Division of THE BALDWIN LO

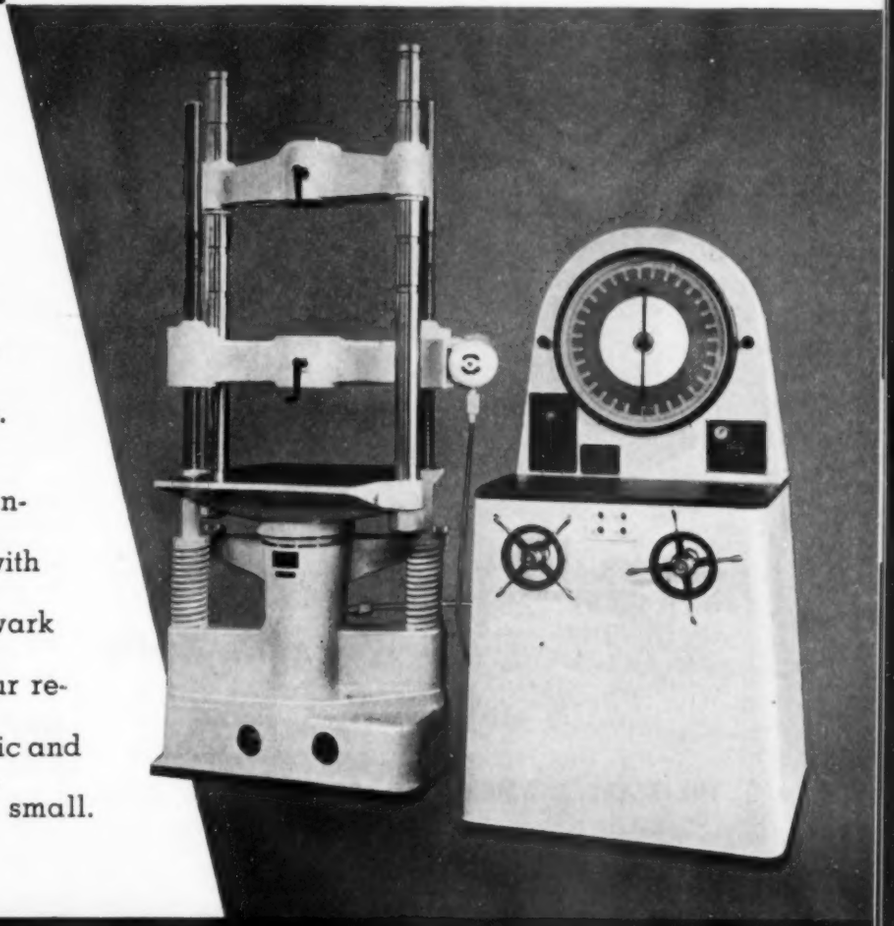


Southwark 36-ft. strongback bending roll

▼ 60,000-lb. Southwark-Tate-Emery universal testing machine

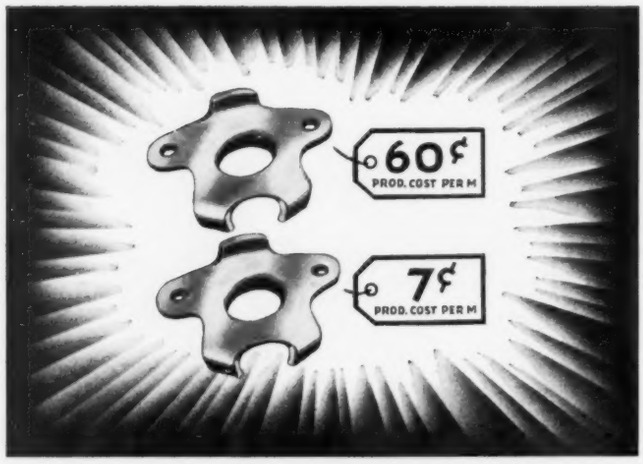
Whether you need specially engineered equipment, or highly developed, heavy-duty standard machines such as Southwark builds in many types, for various sizes and kinds of work, it will pay you to secure Southwark's recommendations.

With 105 years experience in the manufacture of industrial machinery, with unsurpassed shop facilities, Southwark is in a unique position to meet your requirements for all types of hydraulic and special machinery—large and small.



SOUTHWARK

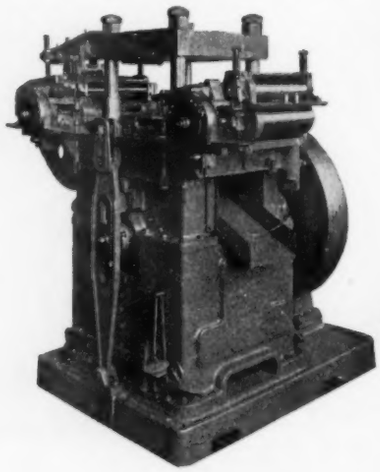
LOCOMOTIVE WORKS PHILADELPHIA



Stampings produced COMPLETE per stroke at 60% to 90% savings on Henry & Wright

DIEING MACHINES!

Replacing 5 to 10 conventional presses, the Dieing Machine saves 60% to 90% of stamping cost. A UNIQUE machine, giving high production of intricate parts COMPLETE per stroke, with product precision held to .0002" as desired.



50-TON DIEING MACHINE

Other capacities: 10 tons to 300 tons. Unique design — embodying Indirect Underdrive and Precision-guiding of upper crosshead—gives amazing freedom from vibration at speeds up to 600 s. p. m. Produces 1 to 20 completed parts per stroke, to precision of .0002" when required.

8 operations performed at every stroke produce 4,800 completed shells per hour from .050" steel with 1⅜" draw.

Of various cartridge clips produced complete per stroke, this one is for .303 rifle produced 100 complete per minute.

Airplane fuselage hinge of duralumin produced complete per stroke in continuous strip.

REQUEST CATALOG 41

THE HENRY & WRIGHT MFG. CO., HARTFORD, CONN.

Steel Presses—Stock Reels—Roll Straighteners

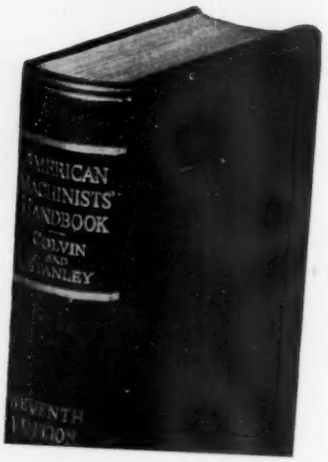
★ ★ ★ ★ ★ ★ ★

★ **HENRY & WRIGHT DIEING MACHINES** ★

★ ★ ★ ★ ★ ★ ★

NEW 7th EDITION

of this handy "pocket companion" for the machine shop worker



revised and renewed—to help you with quick reference to accurate, up-to-the-minute, dependable data, kinks, shortcuts, helps, tables, formulas, and metal-working information.

Colvin and Stanley's

AMERICAN MACHINISTS' HANDBOOK

Seventh edition, 1350 pages, 4 x 6½, over 2500 illustrations and tables, $4.00

JUST where can any worker find as much and so wide a variety of helpful material as is given in this well-planned and well-organized book? Just think of being able to find the answer—the *right* answer—to any question—*quickly*—layouts, feeds, speeds, tools, jigs, fixtures, materials, standards, tolerances—any detail of machine shop or drafting room practice. In one book that will fit into your pocket this Handbook fills all practical reference needs. The Handbook enables you to go ahead at any time, knowing that you are right, with the wealth of expert evidence in the handbook behind you—a service worth many times the cost of Handbook in time, trouble, and wastage saved.

28 helpful sections

Screw Threads
Pipe and Pipe Threads
Drilling
Reamers and Reaming
Taps and Tapping
Files and Work Benches
Babbitting, Brazing, Soldering and Welding
Gearing
Turning and Boring
Milling Machine Feeds and Speeds
Grinding, Honing and Lapping
Screw Machine Tools, Speeds
Punch Press Tools
Broaches and Broaching
Bolts, Nuts and Screws
Measuring and Fitting
Tapers and Dovetails
Shop and Drawing Room Standards
Wire Gages and Stock Weights
Horse-power, Belts and Shafting
Metals and Other Materials
Machine Forgings
Knots and Slings
General Reference Tables
Automotive Data
Railroad Shop Data
Shop Trigonometry
Dictionary of Shop Terms

200 pages larger than the 6th Edition, but priced the same—Send coupon today for free examination

McGRAW-HILL ON-APPROVAL COUPON

McGraw-Hill Book Co., Inc., 330 W. 42nd St., N. Y. C.

Send me Colvin and Stanley's American Machinists' Handbook, 7th edition, for 10 days' examination on approval. In 10 days I will send $4.00, plus few cents postage, or return book postpaid. (We pay postage on orders accompanied by remittance.)

Name .....

Address .....

City and State .....

Position .....

Company .....A. 1-24-41

(Books sent on approval in U. S. and Canada only.)

BUICK didn't have to . . .

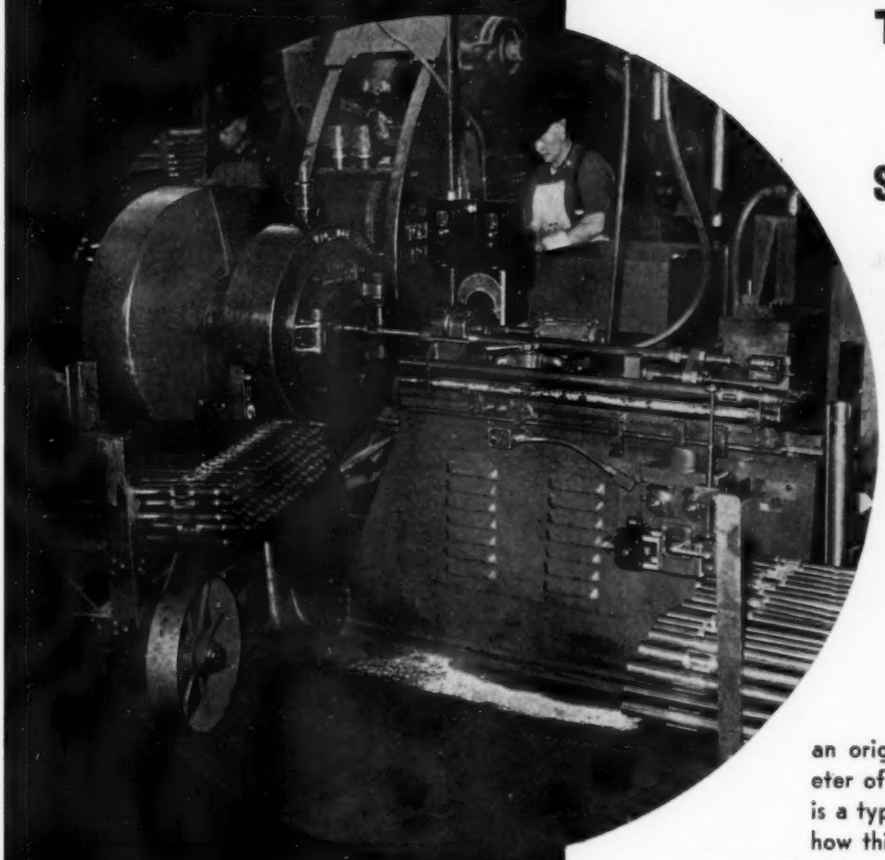
"Ask ETNA about Swaging"

. . . PREVIOUS EXPERIENCE TOLD THEM AN

ETNA

SWAGING MACHINE

would give Speedy, Low Cost Production on Jobs Like This!



● *ETNA unit in service at the Buick plant. Note the automatic feed . . . also note tubes, on truck at right, ready for swaging; on left, after swaging. Photo courtesy Buick Motor Division.*

● Thoroughly familiar with the savings an ETNA Swaging Machine can bring, Buick didn't have to "ask ETNA about swaging" . . . they naturally turned to ETNA when faced with the production job illustrated here. The assembly of this 1941 Buick transmission control tubing called for a tapered reduction from an original diameter of 17/16" to a diameter of 1¼" . . . a typical problem, and this is a typical ETNA solution . . . an example of how this manufacturer managed to get *more* pieces out at *less* cost.

For proof of *why* ETNA Swaging Machines do better work at less cost, look to their basic design and construction features. With the proper application, ETNA's are capable of reducing, sometimes even eliminating preliminary machinery. Consult ETNA about swaging. ETNA swaging machines are built in capacities of ⅜" to 4", with die lengths of 1" to 18". Don't hesitate—"Ask ETNA About Swaging" today!!

IF IT'S A QUESTION OF TAPERING, SIZING OR REDUCING OF ROUND SOLIDS OR TUBING . . .

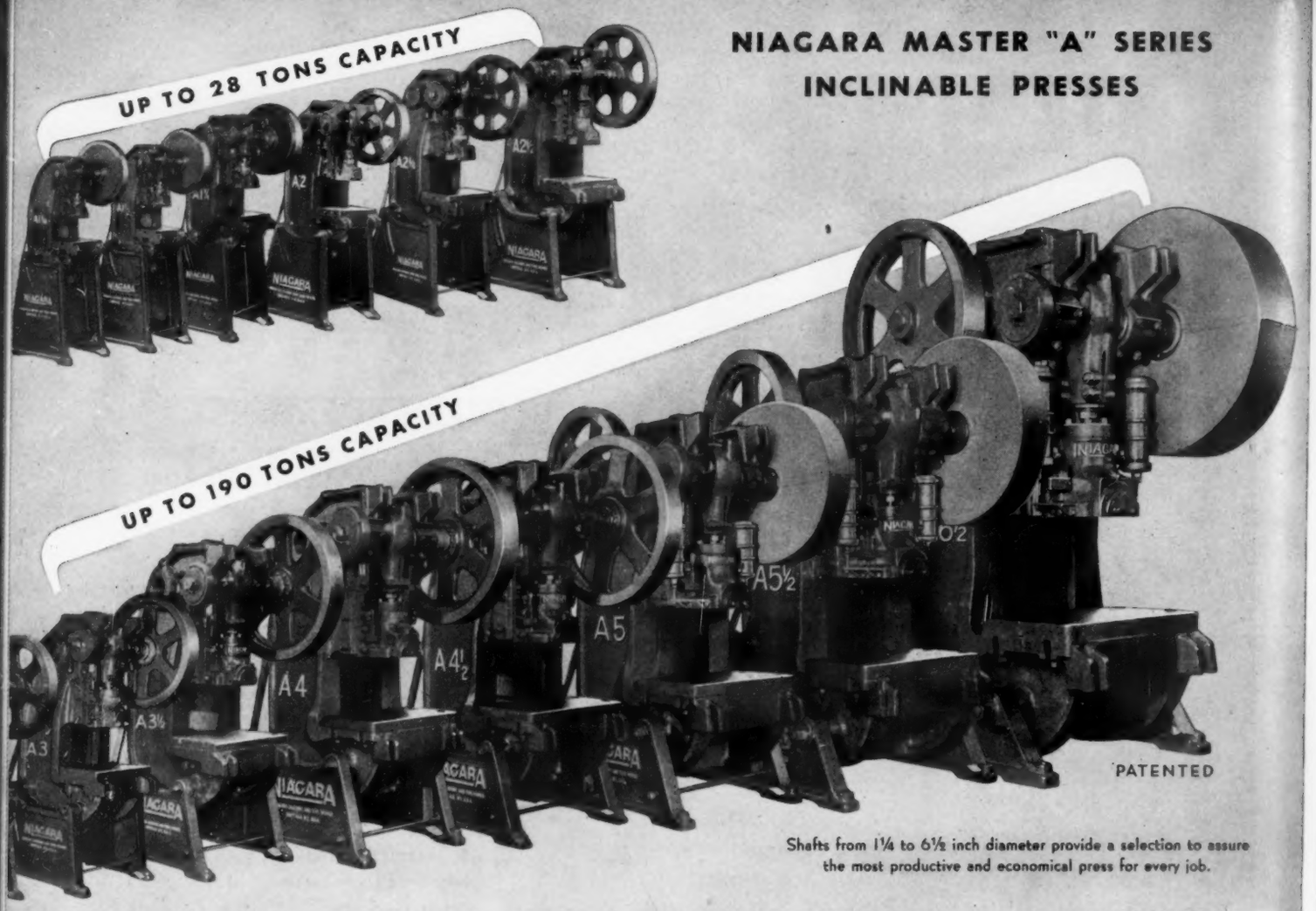
"Ask ETNA About Swaging"

ETNA

MACHINE COMPANY

TOLEDO OHIO

NIAGARA MASTER "A" SERIES INCLINABLE PRESSES



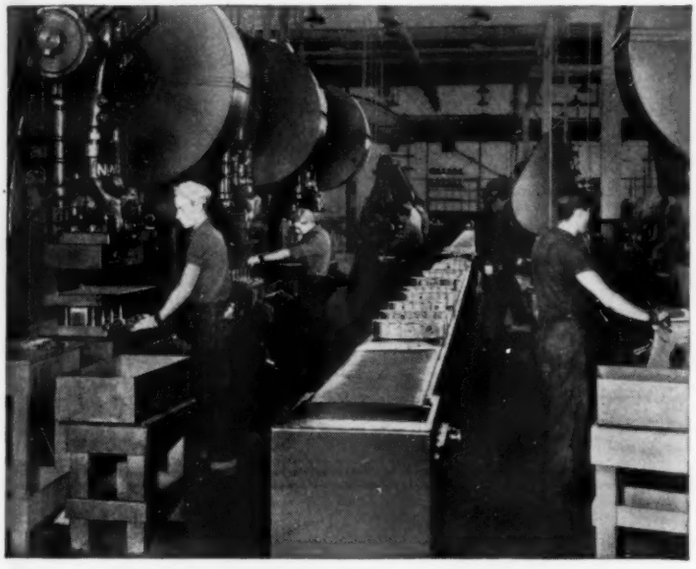
Shafts from 1¼ to 6½ inch diameter provide a selection to assure the most productive and economical press for every job.

America's foremost industries including aircraft, ordnance, shipbuilding, automotive and other plants are speeding up production with Niagara Presses, Shears and Machines for plate and sheet metal work. The illustration above shows the well-graduated line of Niagara Open Back Inclinable Presses. Other types include Single and Double Crank Presses, Horn Presses and Machines for blanking, drawing and forming. Bulletins covering all Niagara Presses are available upon request.

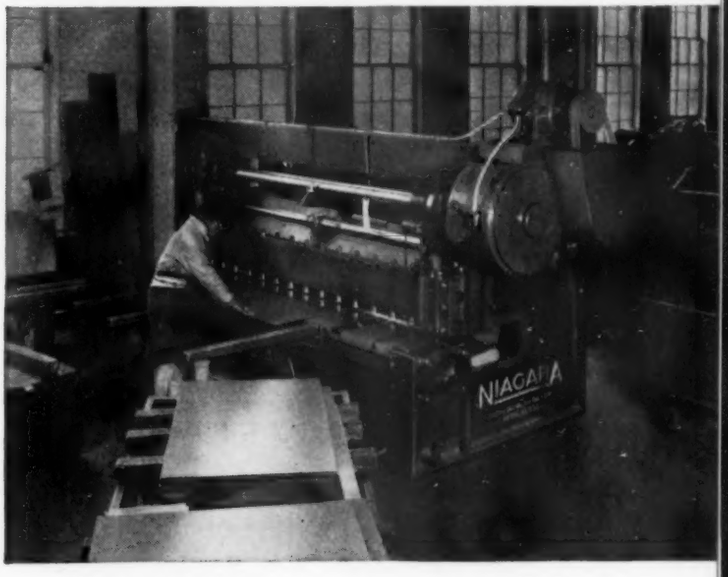
Latest type Niagara Power Squaring Shears shown below are built in cutting lengths from 6 to 18 feet . . . capacities 10 gage to ½ inch. Features include accurate, flat cutting . . . more working strokes per hour . . . convenient handling of stock and off-cut . . . instant acting 14 point sleeve clutch and gears mounted on anti-friction bearings, and enclosed in oil tight case, self-measuring, ball bearing, parallel back gage. Write for Bulletins. Niagara Machine & Tool Works, 637-697 Northland Ave., Buffalo, N. Y. Branches: Cleveland, Detroit, New York.

Emergency demands for defense equipment have focused attention on the proven ability of Niagara Presses to deliver more working strokes per hour. Niagara production and economy are multiplied by thousands of presses throughout the industry.

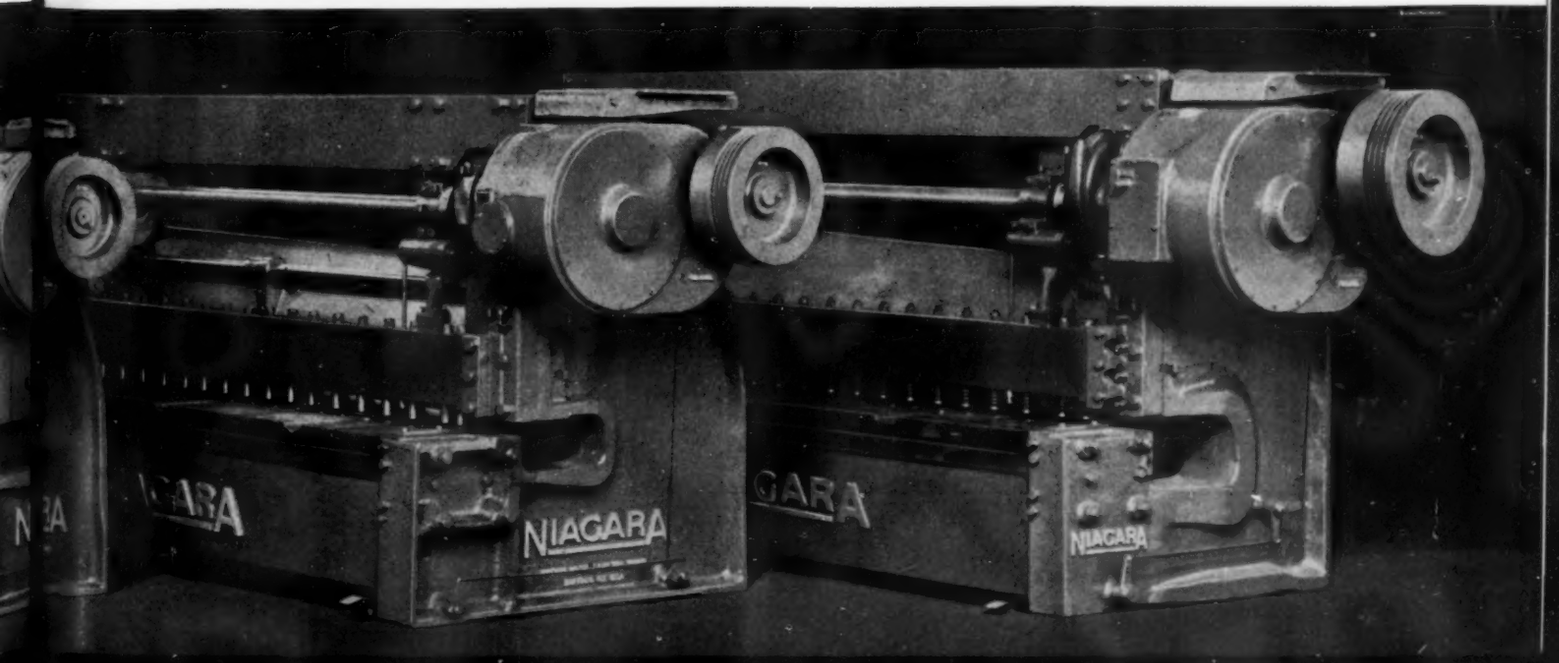
This line-up of Niagara Open Back Inclinable Presses is typical of how America's leading aircraft plants are putting plane manufacturing on a production basis,—another example of modern industry using modern Niagara presses.



Progressive operations in manufacturing automotive parts in large volume are being performed by Niagara Presses. This photograph is typical of many production set-ups in large plants everywhere.



With shearing to size a basic operation in sheet metal working, Niagara Power Squaring Shears are used by aircraft and tank manufacturers, steel warehouses and industries requiring accurate, flat cutting of sheet steel and plate for their products.



QUICK FACTS ON
Dayton Rogers
UNIVERSAL
PNEUMATIC DIE CUSHION

Self contained portable unit, *quickly installed* on any punch press.

Can be applied to advantage on dies already in use in place of *springs or rubbers.* Eliminates excessive strain on metal draw, assuring normal metal strength on finished work.

Adaptable to both drawing and compound blanking and piercing work with bolster plate thickness compensators *(hand wheel adjustment).*

Leader pin (piston stem) fully guided, die cushions rigidly mounted, *eliminating all pin pressure pad deflection.*

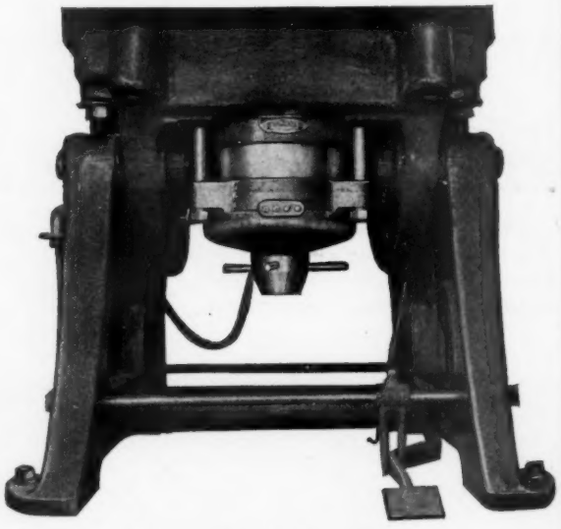
Adaptable for all knock out, ejector, and die pressure pad actions and control.

Ideal for jobbing shops; used to an advantage on both short runs and long runs.

Large pin pressure area possible by use of pin pressure pad, made to fit press bed opening.

Easily lubricated; centralized lubrication system.

Moderately priced; accurately built, simple in design, and universal application.

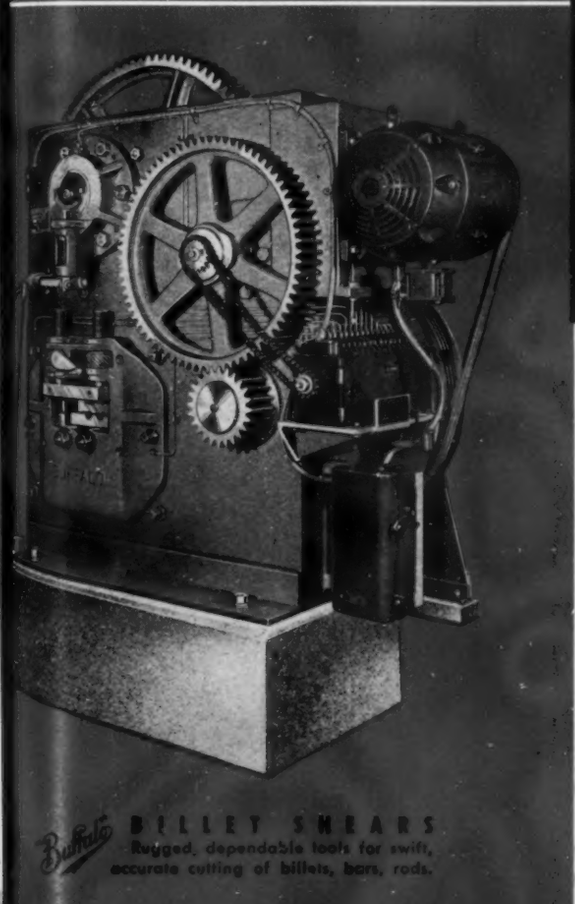


As mounted to the average press

●

DAYTON ROGERS MANUFACTURING CO.
MINNEAPOLIS, MINN.

UNIVERSAL IRON WORKER
Fast machines for punching, shearing, slitting, coping, notching such forms as angles, tees, rounds, squares and flat steel.

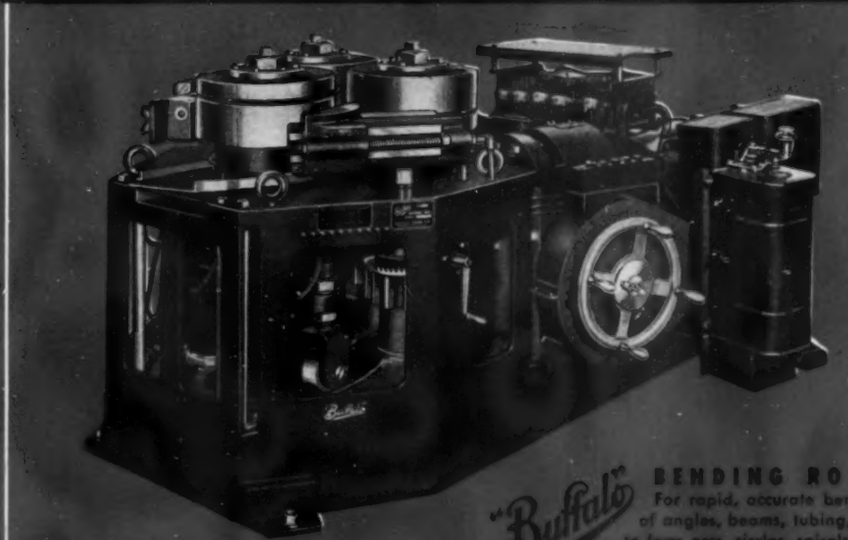


BILLET SHEARS
Rugged, dependable tools for swift, accurate cutting of billets, bars, rods.

WATCH PRODUCTION *jump* WHEN THESE "Buffalo" MACHINES *go to work!*

The cry of *"faster schedules"* holds no headaches for production men backed by Buffalo metal working tools! These tools are designed for swift efficiency, built from the floor up to stand the gaff of tough, 24-hour-a-day duty. Easy to control, economical to operate, and they turn out the work with unvarying precision. Better start thinking today about those weak links in your production. Call in a Buffalo engineer. Meanwhile write for literature.

BUFFALO FORGE COMPANY
448 BROADWAY BUFFALO, N. Y.
Canadian Blower & Forge Co., Ltd., Kitchener, Ont.



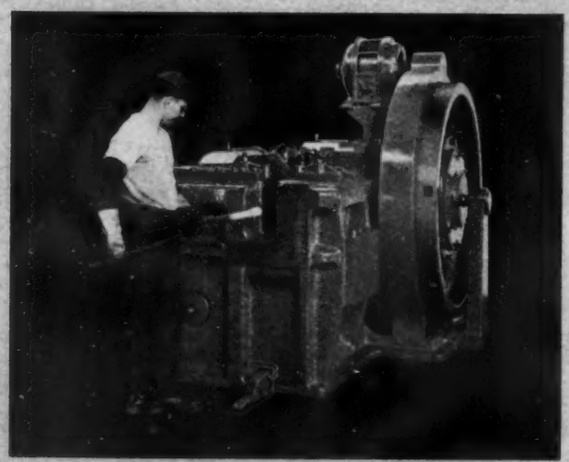
"Buffalo" BENDING ROLLS
For rapid, accurate bending of angles, beams, tubing, etc., to form arcs, circles, spirals and other circular shapes.

Buffalo

Universal Iron Workers
Billet Shears... Bending Rolls

AJAX FORGING MACHINERY

Substantially increases production . . . reduces costs.



AJAX METAL WORKING MACHINERY

FORGING MACHINES • FORGING PRESSES • FORGING ROLLS • BOLT HEADING AND FORGING MACHINES • BULLDOZERS • HOT SAWING AND BURRING MACHINES • CONTINUOUS MOTION RIVET HEADING MACHINES • AJAX-HOGUE WIRE DRAWERS • BAR DRAWING AND STRAIGHTENING MACHINES • WIRE DRAWING, STRAIGHTENING AND CUTTING OFF MACHINES

Buy Forging Equipment
On the Basis of Mechanical Soundness

Buyers of forging equipment should insist upon mechanical soundness as the prerequisite rather than accept equipment because it is available immediately.

Ajax is prepared to produce units of forging equipment on an increased schedule which protects users from having to accept equipment merely on the basis of availability. Ajax has improved and expanded, and is again improving and expanding its manufacturing facilities. Machine tool requirements have been anticipated so that all machining still can be performed within its own plant, even on greatly increased outputs and established standards of accuracy maintained. Heavy casting requirements are anticipated so that these come from the foundry to the Ajax plant in steady flow.

The mechanical ability of every employee is utilized to the utmost, and the training of younger men for the exacting machine work required in the construction of Ajax Forging Machines has been and is being followed as an established policy.

In all this there is not the slightest compromise on the mechanical soundness that assures productive capacity, accuracy and dependability of Ajax Forging Machinery on high speed production. There is at present no occasion to forego the increases in production that are available through the use of Ajax Forging Equipment, and users who will accept nothing less can obtain reasonable deliveries of Ajax Forging Machines with their established mechanical soundness.

THE AJAX MANUFACTURING COMPANY

621 MARQUETTE BLDG. CHICAGO, ILLINOIS

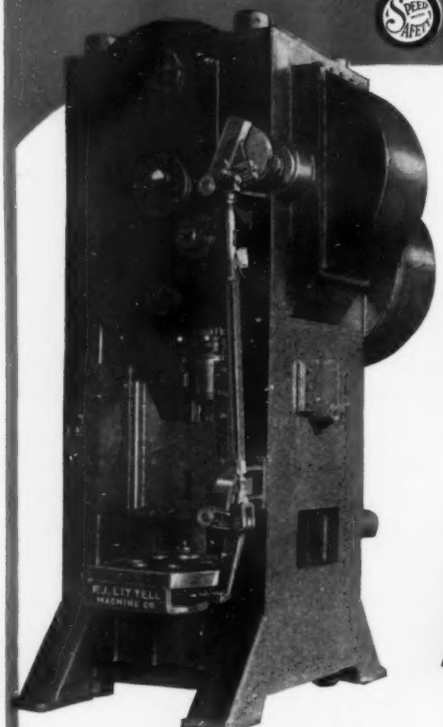
EUCLID BRANCH P.O. CLEVELAND, OHIO

201 DEWART BUILDING NEW LONDON, CONN.

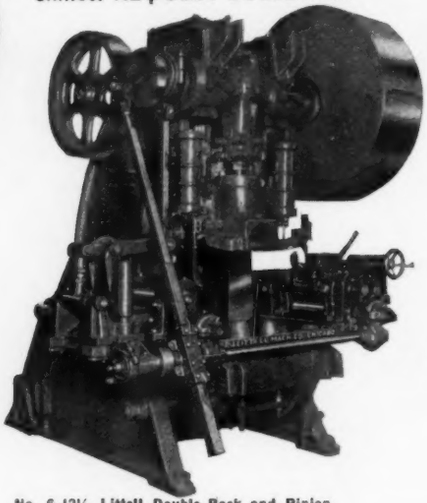
LITTELL *for Faster Defense Production*

Top speed in National Defense production can be secured with Littell Roll and Dial Feeds, used by leading concerns for increasing output 200 to 300 per cent.

Littell pressroom equipment includes—Reels for coil stock, Roll and Dial Feeds, and Feeding and Straightening Machines. REQUEST BULLETINS.



Littell Dial Feed, mounted on large straight-sided press, for producing cartridge cases. Dial Feeds of this type, used in cartridge case manufacture, perform the following operations: 1st, 2nd and 3rd draw, heading and indenting, piercing and tapering.
REQUEST BULLETIN SEC. 30.



No. 6-12½ Littell Double-Rack and Pinion Roll Feed with Power-Driven Straightener and Scrap Cutter, for blanking and drawing small shells. Mounted on large open-back inclinable press. Feed length, 0 to 15". Feed rolls, 6¼" dia. x 12½" long.
REQUEST BULLETIN NO. 1-A.

No. 3-G Littell Patented Motor-Driven Automatic Centering Reel and Scrap Winder, for unreeling material to automatic presses. Capacity, 300 lbs., 6½" wide.
REQUEST BULLETIN SEC. 5-C.

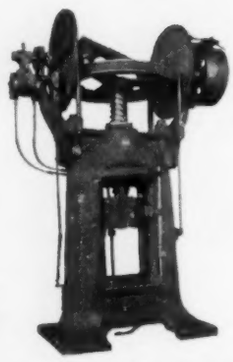
F. J. LITTELL MACHINE CO.
1969 RAVENSWOOD AVE., CHICAGO, ILL.

POWER Z&H PRESSES

***Assuring* LOWER OPERATING COSTS *and* HIGHER PRODUCTION *for* 1941**

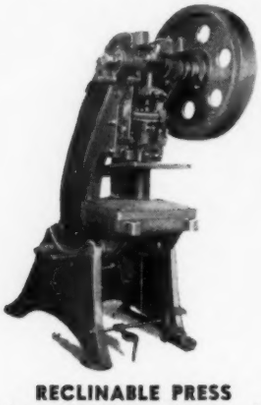
. . . the product of more than 37 years of specialized experience

Zeh & Hahnemann Presses are modern in every detail of design and construction and can be depended on for the maximum in productivity and accuracy at a minimum in operating and maintenance costs. Consult Z & H engineers on your press problems.
The units shown here are typical of the complete Z&H line.

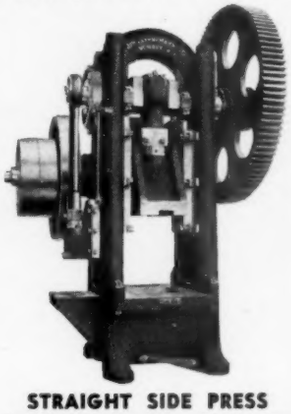


PATENT PERCUSSION PRESS
Designed for hot pressing brass and non-ferrous metals, cold pressing steel parts, —ideal for coining, striking or sizing. Assure uniform blow and maximum number of strokes per minute.

HORN PRESS
Designed especially for producing sheet tin utensils, hardware, parts for automobiles and similar work. All features of larger presses are offered to assure accuracy, speed and long die life.



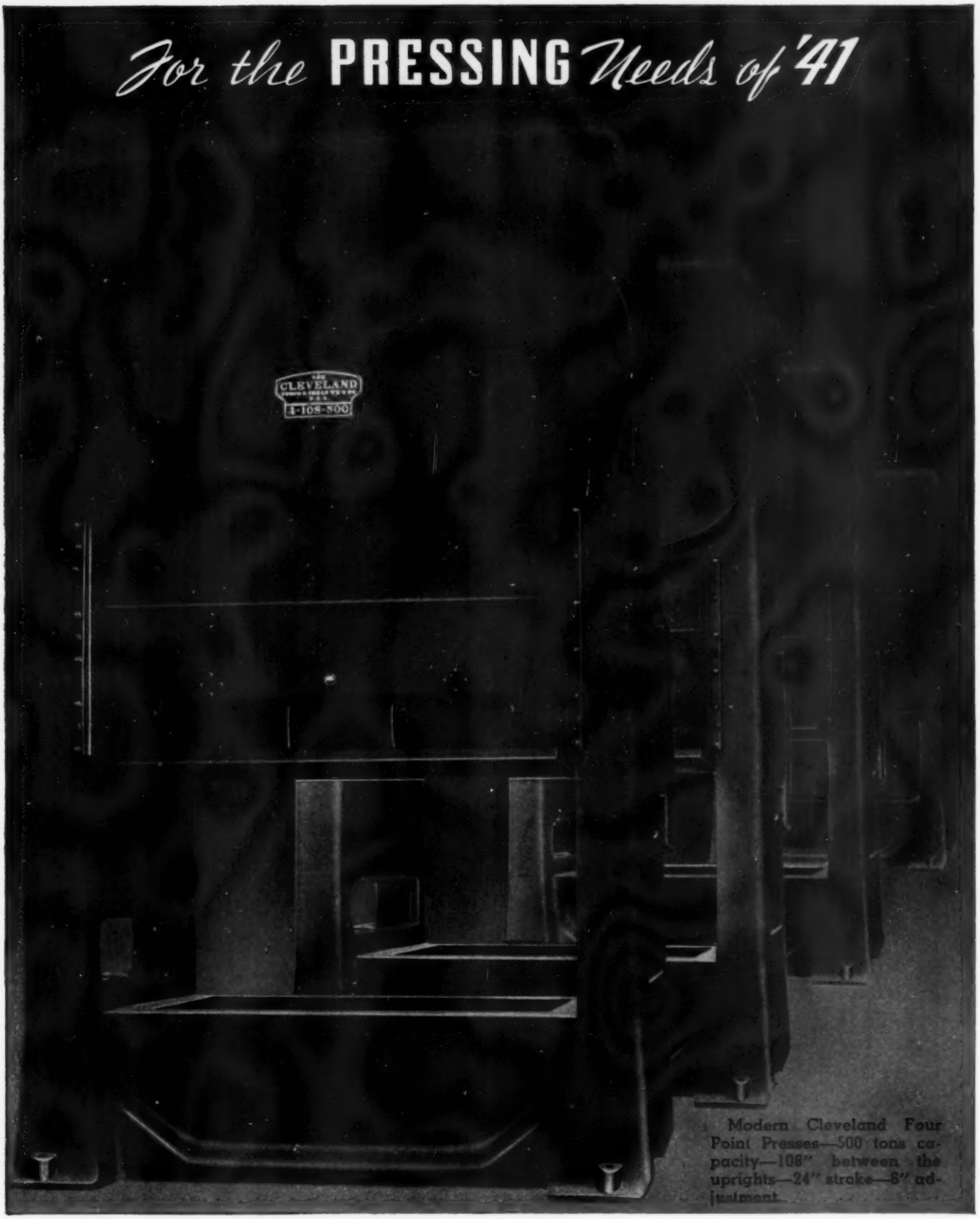
RECLINABLE PRESS
Suitable for general stamping work. Reclines to 40°. Heavily constructed for long life, adjustable for wear, this press is designed for maximum pressure without springing, and is equipped with all modern safety and convenience features.



STRAIGHT SIDE PRESS
A solid frame press designed to stand up under heavy blanking and forming work through construction which takes all stresses centrally. Wedge adjustment for slide provides a more limited but very fine adjustment.

ZEH & HAHNEMANN CO. 182 VANDERPOOL ST. NEWARK, N. J.

For the PRESSING *Needs of '41*



Modern Cleveland Four Point Presses—500 tons capacity—108" between the uprights—24" stroke—6" adjustment.

Speed, accuracy and economy of production—these are the Pressing needs of '41 and Cleveland is fully prepared to meet them, not only with Modern Single Point, Two Point and Four Point Presses but also with eleven other distinct types including Inclinable, Punch Type, Horning, Knuckle Joint, Straight Sided Crank, Double Action Toggle, etc., each of which incorporates every known feature for efficiency and low cost operation.

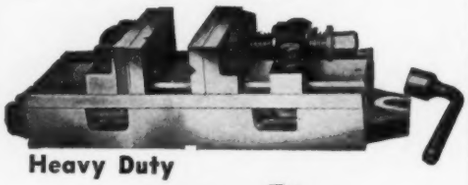
Modern Presses THE CLEVELAND PUNCH & SHEAR WORKS COMPANY *Cleveland, Ohio*

PRODUCTION EQUIPMENT

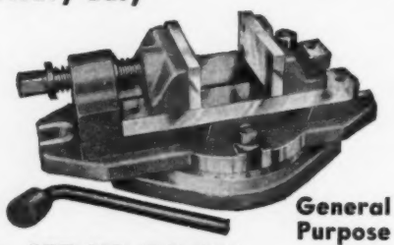
will speed '41 production

● **DIE SETS**

● **MACHINE VISES**

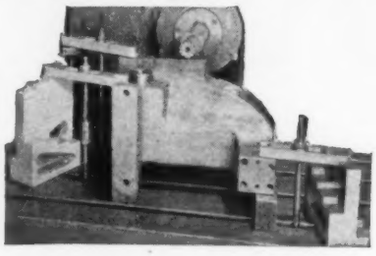


Heavy Duty



General Purpose

● **SET-UP TOOLS**



● **UTILITY PRESS**

FAST SERVICE ON PRODUCTO MASTER AND STANDARD DIE SETS

Complete, quick service for Die Makers in every part of the country is offered by Producto. Assembly and warehouse facilities are available at Bridgeport, Conn., Detroit, Mich., and Cleveland, Ohio. In addition complete facilities are available at Detroit for manufacturing, assembling and shipping all Producto Cataloged and Special Die Sets. Ohio, Western Pennsylvania and West Virginia are served by the Die Supply Co., 1390 E. 30th St., Cleveland, Ohio.

Pacific Coast requirements are handled by Joseph C. Fletcher, 1415 Folsom St., San Francisco, Cal., and Frey Industrial Supply Co., 3828 Santa Fe Ave., Los Angeles, Calif.

Middle Western points are served by motor truck from Detroit, Mich. Producto Die Sets are available in semi-steel or steel for mounting dies, for power presses, plastic molds and die castings. Accessories include Dowel Pins, Stripper Bolts, Bolster Plates, Torch Cutting and Welding Steel Plate. Write for the new 100 page Producto Catalog No. 9.

ACCURATE, SECURE HOLDING ASSURED BY PRODUCTO MACHINE VISES

Work is supported and clamped on hardened surfaces. Bodies of semi-steel, reinforced with hardened and ground wearing surfaces, and are practically indestructible. Jaws are adjustable in any desired position and provide extra large opening. Two sizes 6" and 4½".

Producto Vises are available for both heavy duty and general purpose milling and drilling. Full details on request.

A WIDE RANGE OF UTILITY IS OFFERED BY PRODUCTO SET-UP TOOLS

Time and savings, convenience and safety in setting up and clamping work on machine tools are assured by these standardized Producto tools. Included are: "Build Up" Steel Blocks, "T" Slot Nuts and Bolts, Work Holding Clamps and Adjustable Clamp Screw Jacks. Ask for bulletin giving valuable information on applications.

MAKE TIME SAVINGS WITH THE PRODUCTO UTILITY PRESS

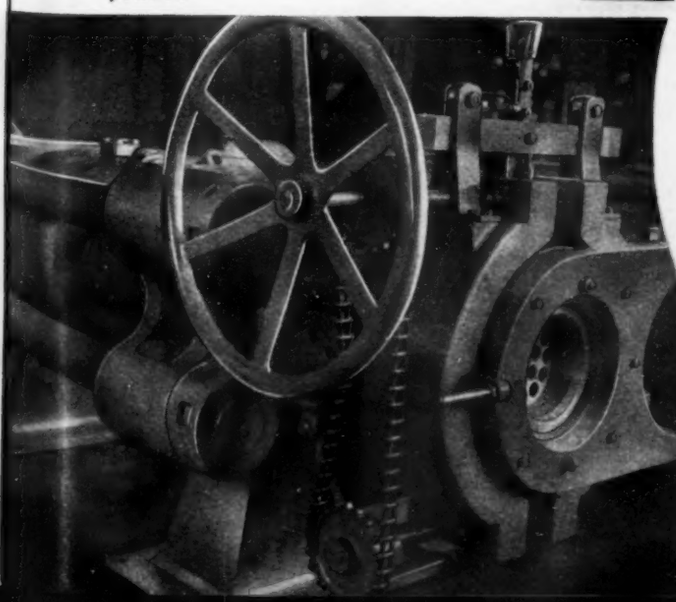
Investigate the possibilities of this versatile general purpose machine for shop or tool room service. It is powerful, convenient, fast and sturdy and because of its adaptability assures time savings on many operations. Write for detailed specifications.

AGAIN IN 1941

20 Ton Straightening Press used in the production of rifle barrels.

50 Ton Press used for straightening .37 m.m. gun tubes upon completion of the roughing cut.

550 Ton Horizontal Screening and Finishing Press — used in the production of smokeless powder.



1350 Ton Lead Wire Extrusion Press used in the making of caliber .30 bullet cores.

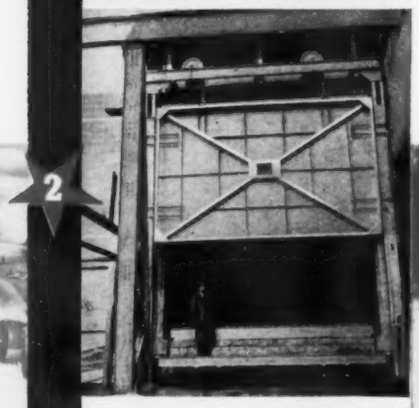
Again in 1941—as in 1917—Watson-Stillman Hydraulic Presses will play an important part in stepping up the production of the vital necessities of defense.

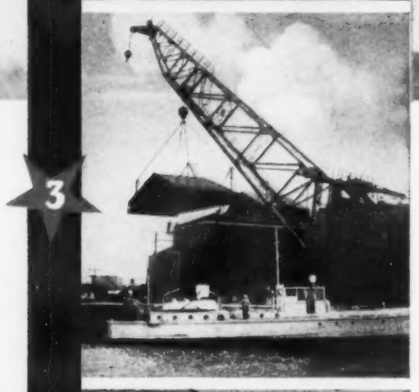
For more than 85 years Watson-Stillman has built hydraulic machines of all types. Besides those illustrated, they include presses serving a score of industrial uses...such as—metal extrusion, flanging, bending, straightening and forming.

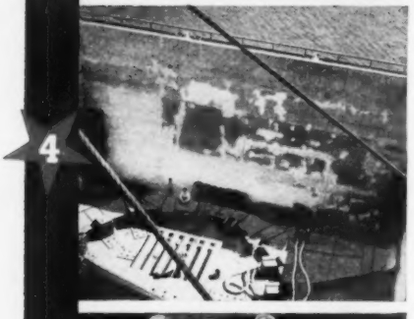
Your production problem, if it involves hydraulic machinery, may be solved by consulting W-S Engineers—Ask them.

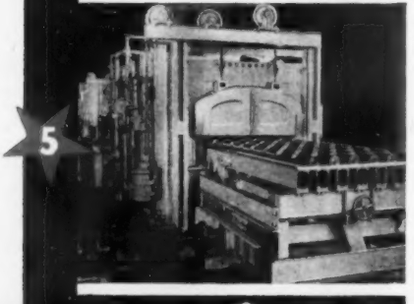
THE WATSON-STILLMAN CO., ROSELLE, N. J.

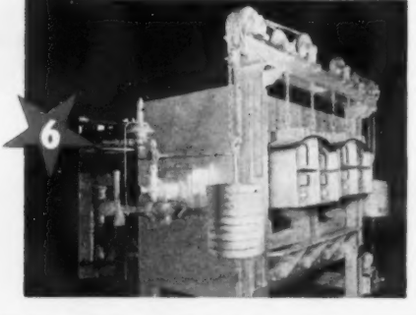
WATSON-STILLMAN

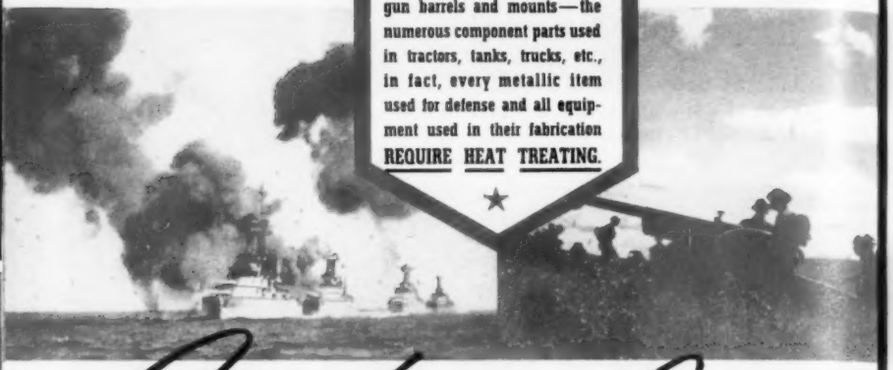












© 1940 SURFACE COMBUSTION CORPORATION

● Armor plate, aeroplane parts, shells, cartridge cases, bombs, gun barrels and mounts—the numerous component parts used in tractors, tanks, trucks, etc., in fact, every metallic item used for defense and all equipment used in their fabrication REQUIRE HEAT TREATING.

Navy Yards and Arsenals ARE SPEEDING UP FOR NATIONAL DEFENSE WITH SC FURNACES

● Working closely with Government arsenals and navy yards, Surface Combustion has been instrumental in perfecting furnaces for the heating and heat treating of ordnance items. At the same time, Surface Combustion has secured a wealth of valuable experience and is prepared to pass this knowledge on to industry cooperating with the Government in these critical times.

Since practically every metallic part must be heat treated, modern furnaces are a vital part of the national defense program in which mass production is essential. The modern furnace is vastly different from its World War predecessor. Perhaps in no other metal processing machine has there been so many outstanding improvements in the last 22 years.

This is no idle statement for it was during the years of 1917-1918 that the continuous furnaces first came into prominence. Far-reaching developments have since taken place . . . in temperature distribution, automatic control (both of temperature and mechanisms), heat resisting alloy mechanisms, methods of heat transfer, and furnace atmosphere for control over both scale and decarburization.

For speeding up the national defense program, Surface Combustion today offers industry the benefits of experience accumulated during and since the World War . . . gained through cooperation with the arsenals and navy yards, the steel, automotive, agriculture, aircraft, non-ferrous and allied industries.

No matter what national defense item you are manufacturing . . . armor plate, shells, cartridge cases, bombs, gun barrels or mounts, any metallic part, tractors, tanks, trucks, aeroplane, or other ordnance vehicles . . . Surface Combustion has the facilities, ability, and experience to help you produce better heat treated parts, faster and at lower costs. Write to

SURFACE COMBUSTION CORPORATION • TOLEDO, OH

1 Car Bottom Recirculated Air Furnace for stress relieving gun carriages at Washington Navy Yard.

2 Front view of Recirculated Air Car Bottom Furnace at Washington Navy Yard.

3 Large Recirculated Air Furnace for stress relieving welded gun carriages at the Brooklyn Navy Yard. The parts treated are so large that it is necessary to remove the roof of the furnace for charging.

4 Looking down into SC Furnace. Similar SC Furnace is also installed at Philadelphia Navy Yard.

5 Completely automatic unit for hardening, quenching, and drawing shells at Frankfort Arsenal.

6 Forge Furnace at Rock Island Arsenal. Maximum temperature 2700°F.

WHEREVER HEAT IS USED IN INDUSTRY

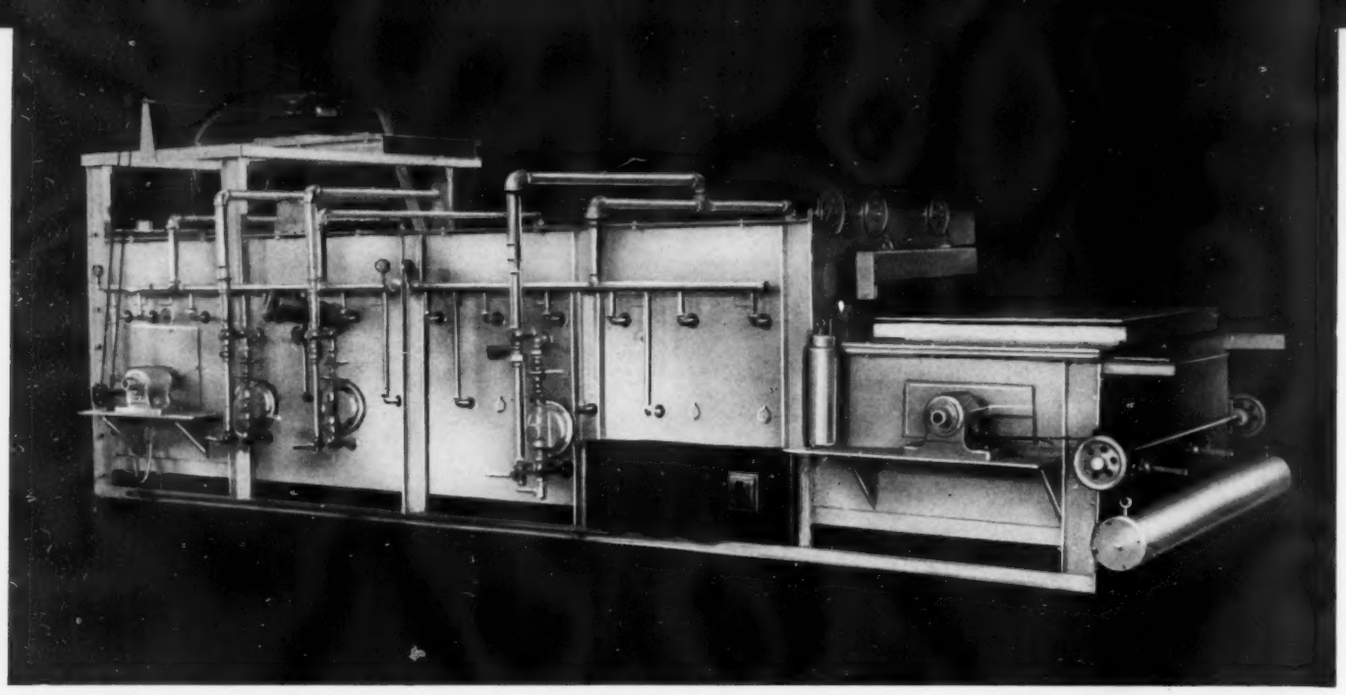
SURFACE SC COMBUSTION

MANUFACTURERS OF INDUSTRIAL FURNACES • AMITROL GAS FIRED SPACE HEATING EQUIPMENT • AND KATHABAR AIR CONDITIONING SYST

Welding, Heat-Treating, Cleaning and Finishing

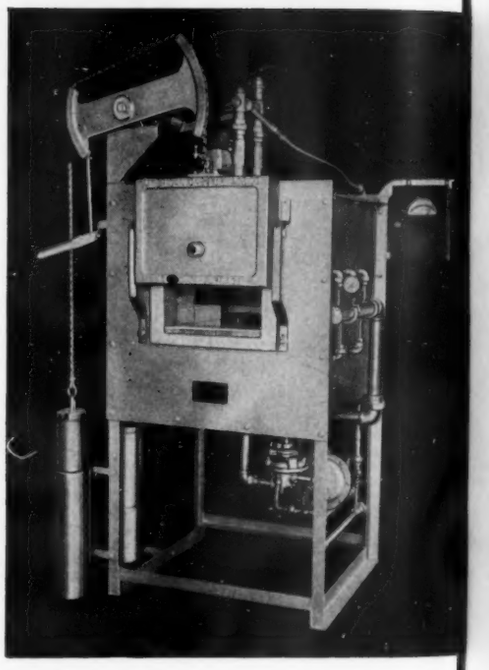
FURNACES AND HEATERS • TEMPERATURE CONTROL DEVICES • HEAT-TREATING ACCESSORIES AND SUPPLIES • ELECTRIC WELDING EQUIPMENT • GAS WELDING AND CUTTING EQUIPMENT • WELDING ACCESSORIES AND SUPPLIES • POLISHING MACHINES AND SUPPLIES • SHOTBLAST EQUIPMENT • CLEANING AND DRYING EQUIPMENT • CLEANING COMPOUNDS • RUST PREVENTATIVES • PLATING EQUIPMENT AND SUPPLIES • PAINT SPRAY EQUIPMENT • PAINTS, LACQUERS, ENAMELS AND PRIMERS

AMERICAN MACHINIST'S 28TH ANNUAL BUYERS REFERENCE NUMBER



Above is shown a Link-belt conveyor Heating Machine used for hardening or normalizing a large variety of forgings. Capacity 600 to 1200 pounds per hour.

To the right is our latest development, a Bell-Oven Furnace for use with specific atmospheres for "Ni-Carbing," carburizing, nitriding, etc.



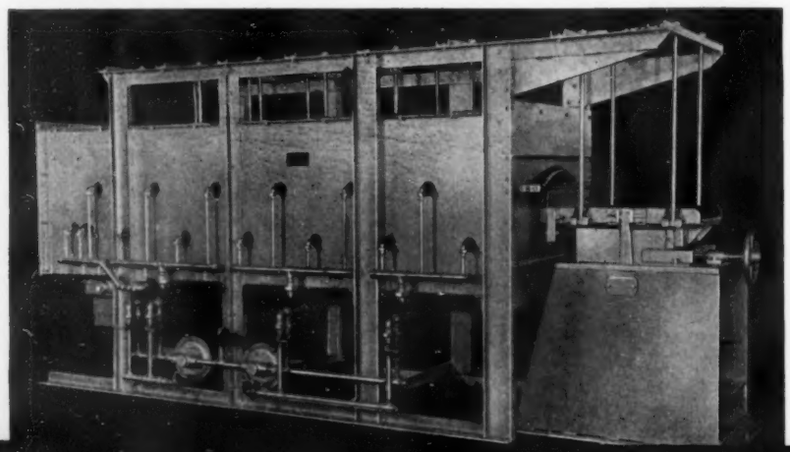
FOR PRODUCTION
TODAY *and* TOMORROW

Today, National Defense is the first consideration of every good American. We are eager to do our part by cooperating with you in filling the heat treating requirements of your National Defense contracts now, and in so doing, to supply you with equipment which can be used to insure profits in NORMAL PEACETIME PRODUCTION thereafter.

AMERICAN GAS FURNACE CO.

ELIZABETH, N. J.

Below, is illustrated the largest of our line of Reciprocating Heating Machines, used to harden rifle clips, machine gun links and a wide variety of small and medium sized work.



Write . . .

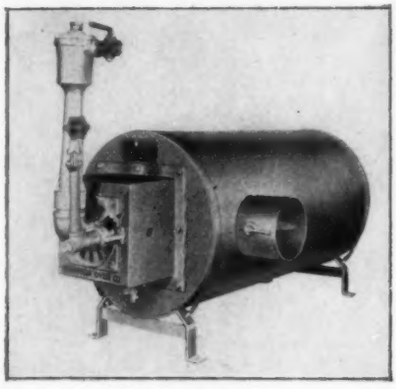
FOR YOUR FREE COPY OF OUR NEW CATALOG AND DATA BOOK NO. 602

A special section on S.A.E. steels and their treatment, a hardness conversion table, a temperature conversion table and other data.

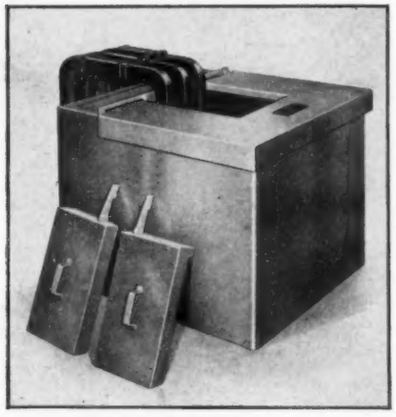
It's yours free for the asking. It contains 120 pages of valuable data on all types of heating and heat treating products, including: Blowpipes and Burners, Furnace Burners, Forges, Oven Furnaces, Pot Furnaces, Melters, Heating Machines, Blowers, Tube Furnaces, and many others. This A. G. F. Catalog and Data Book also contains a section on accessories, including: Pyrometers, Automatic Temperature Controls and Flow Meters.

Mail your request today on your company letterhead to be sure of your copy; no obligation.

WELDING, HEAT-TREATING, CLEANING and FINISHING

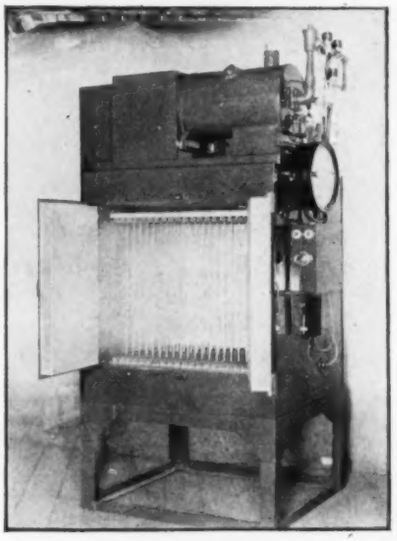


AIR HEATERS—*Despatch Oven Co., 622 Ninth St., S.E., Minneapolis, Minn.* Type DG direct gas-fired air heaters in capacities from 75,000 to 1,000,000 B.t.u. per hr. convert ovens, dryers and furnaces into high-speed units with maximum operating temperature of 1,250 F. Vol. 84, p. 31.



ELECTRIC FURNACE—*A. F. Holden Co., New Haven, Conn.* A three-phase electrode furnace having vertical individually adjustable electrodes permits electrodes to be used on the narrow width up to 30 in. in length. Vol. 84, p. 148.

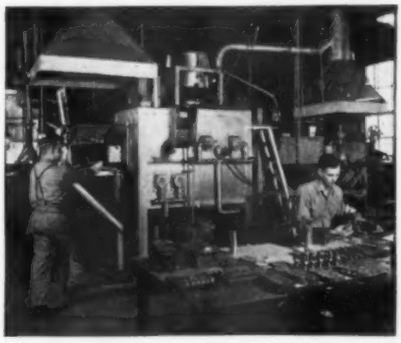
IMMERSION HEATER — *Westinghouse Electric & Mfg. Co., Mansfield, Ohio.* "Corox" immersion heater is especially designed for oil tempering baths. Made of steel tubing, this heater has a low watt density. It is available with an effective heating depth of either 5 or 10 in. The 5-in. unit is rated at 2,000 watts; the 10-in., 4,000 watts. Vol. 84, p. 270.



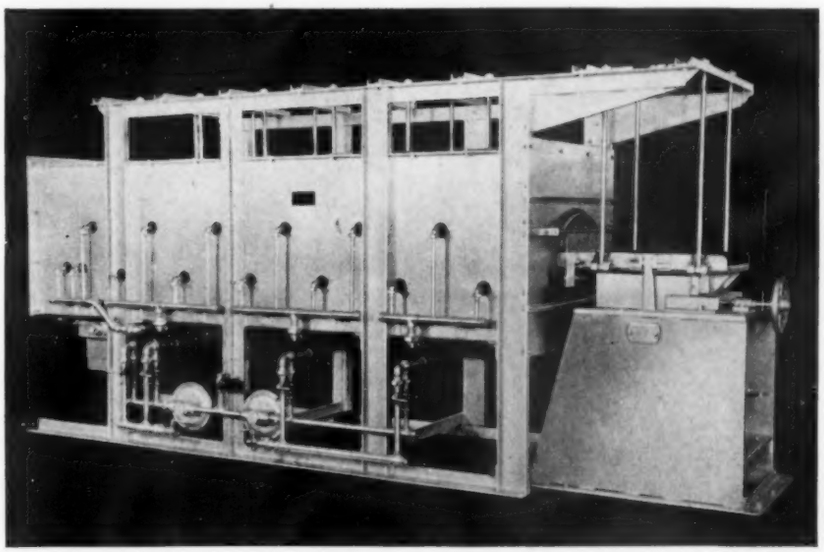
TEMPERING FURNACE—*Despatch Oven Co., 622 Ninth St., S.E., Minneapolis, Minn.* This furnace is arranged for tempering and drawing bandsaw blades which are wrapped in coils and rolled into the furnace in an upright position. It has a maximum temperature of 800 F. This can be increased to 1,250 F. by increasing the insulation thickness, by lining the sides with stainless steel and by reinforcing it. Furnace is 35 in. wide, 30 in. high and 30 in. deep. Vol. 84, p. 309.

IMMERSION HEATERS—*Westinghouse Electric & Mfg. Co., Mansfield, Ohio.* Two improved types of oil immersion heaters (not shown) designed specifically for mineral oil, paraffin and alkaline cleaning solutions, are offered. Non-circulating heater is designed for tanks requiring little circulation. Heating tubes range from 14 to 37 in. long with a rating of 1 to 3 kw. Heater tubes on the circulating type range from 32½ to 37 in. long, with ratings of 5 to 8 kw. Vol. 84, p. 268.

FURNACE—*Johnson Gas Appliance Co., 520 East Ave., Cedar Rapids, Iowa.* Although designed primarily for hardening high-speed steels, No. 70 heat-treating furnace can be used for carbon and intermediate steel, and is recommended for hardening punches, dies or tools. Firebox temperatures of 2500 F. can be obtained. Vol. 84, p. 312.

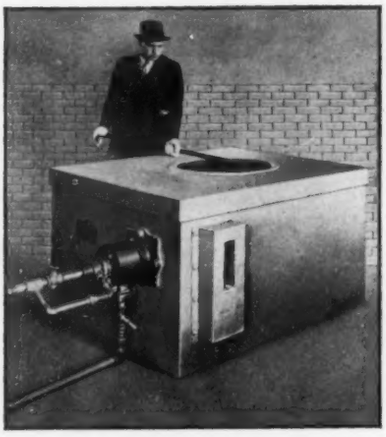


ATMOSPHERE FURNACE—*Surface Combustion Corp., Toledo, Ohio.* Brazing of cemented carbide tool tips to shanks is an outstanding use of the "Char-Mo" atmosphere furnace, which maintains surface cleanliness without decarburization of high-carbon shanks. Atmosphere is 2/3 nitrogen and 1/3 carbon monoxide. Vol. 84, p. 1098.

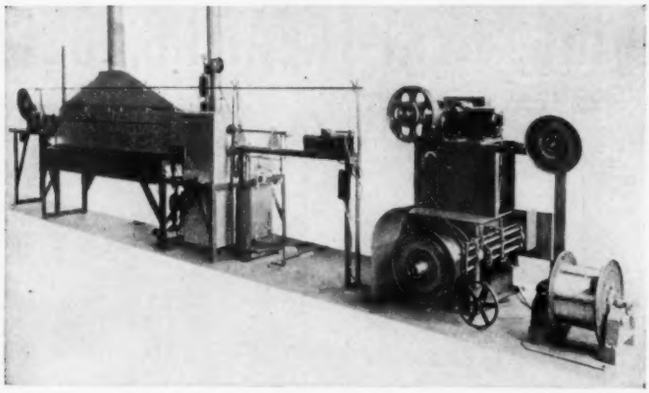


CLEAN HARDENING FURNACE—*American Gas Furnace Co., Elizabeth, N. J.* Having a capacity of 400 to 600 lb. per hour, No. 191 continuous clean hardening machine eliminates conveyor troubles since all mechanism is placed outside the furnace proper. Either a full muffle or an open hearth is supplied. Motor drive is in a separate extension. It consists of a 1200-r.p.m. 1½-hp. motor with variable transmission and speed reducer. Two controls—one at the charging end and one at the discharge end—provide quick temperature response. Vol. 84, p. 391.

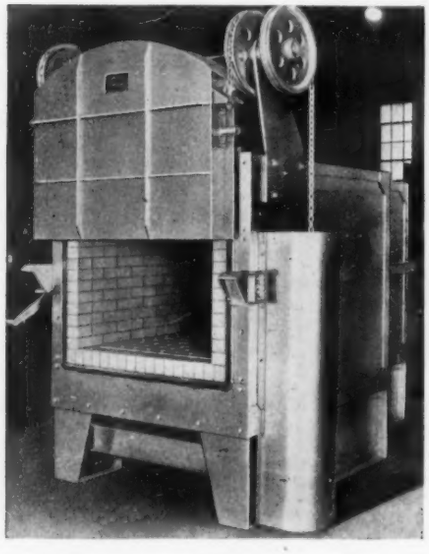
WELDING, HEAT-TREATING, CLEANING and FINISHING—Furnaces



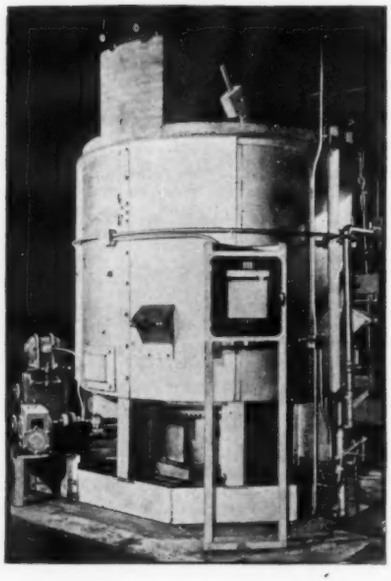
POT FURNACE—*A. F. Holden Co., New Haven, Conn.* An improved pot furnace is claimed to secure approximately 30 per cent fuel recuperation. It can be built in either gas or oil fired units. Vol. 84, p. 110.



ANNEALING UNIT—*Surface Combustion Corp., Toledo, Ohio,* and *Syncro Machine Co., 420 Lexington Ave., New York, N. Y.* "Syncro" open flame annealing and tinning unit is built for high-speed tinning and annealing of wire. Standard machine is a six-strand unit, though machines can be furnished to accommodate any number of strands up to twenty. Vol. 84, p. 796.

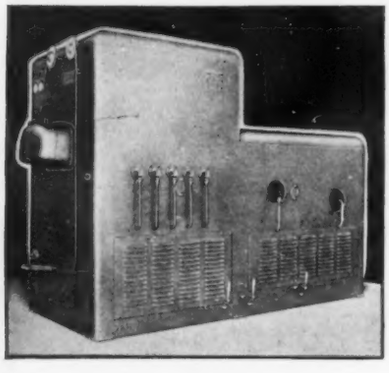


ELECTRIC FURNACE — *Lindberg Engineering Co., 221 N. Laflin St., Chicago, Ill.* "Cyclone" forced circulation electric tempering furnace is built in two types—Toolroom model (not shown) for tempering, heating and preheating tools, dies and other small parts, and production box type, illustrated, built in larger sizes. Standard temperature ranges are from 200 to 850 F. for the Toolroom model and from 200 to 1,250 F. for the Production model. Vol. 84, p. 794.

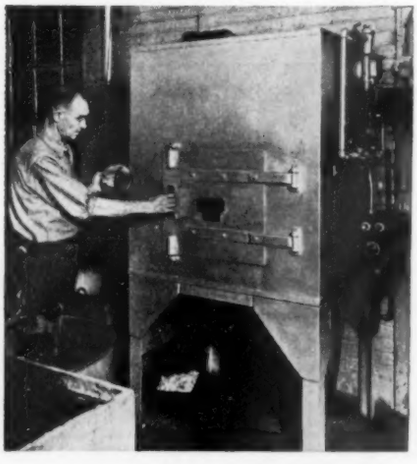


HEAT-TREATING FURNACE — *Mahr Mfg. Co., Div. of Diamond Iron Works, Inc., Minneapolis, Minn.* A rotary forging and heat-treating furnace claims several advantages through use of single burner center firing. Products of combustion come into equilibrium before coming in contact with the steel, thereby minimizing scale and decarburization. Hearth diameters range from 4 to 9 ft. Unit operates on either oil or gas, at temperatures from 1,400 to 2,500 F. Vol. 84, p. 734.

RIVET HEATER—*American Car & Foundry Co., 30 Church St., New York, N. Y.* "a.c.f." Berwick electric aluminum rivet heater handles 24 rivets at once. Rivet diameters run from ⅛ to 1⅛ in. Length of heat depends upon rivet length, which can be up to 4 in. Any temperature up to 1,000 F. can be obtained. Rating is 15 kva. Vol. 84, p. 896.

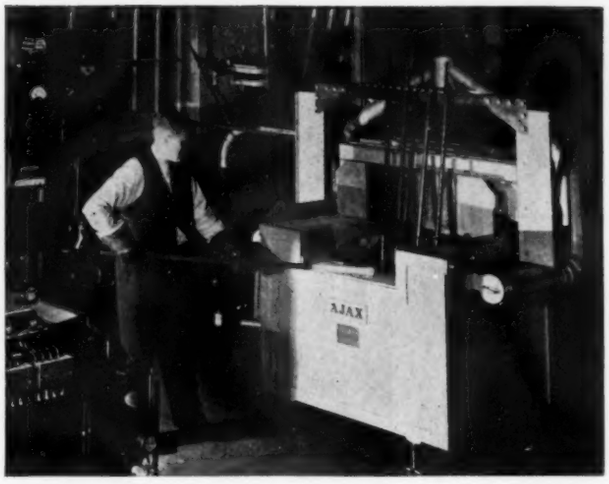


ATMOSPHERE FURNACE—*Lithium Corp., 175 Fifth Ave., New York, N. Y.* Using a specially developed compound having the property of neutralizing furnace gases, the "Lithco" atmosphere furnace permits heat-treatment of iron and alloy and carbon steels without danger of carburization, decarburization, scaling, nitriding or hydrogen embrittlement. In this furnace, steels of different carbon analyses can be heated simultaneously, with no change in the surface analysis of any of them. A carrier gas, generated within the furnace, entrains a vapor which evolves continuously from a cartridge refill and bathes the work in this neutralized atmosphere. Control is fully automatic. Furnace is a self-contained unit, with no moving parts. Vol. 84, p. 779.

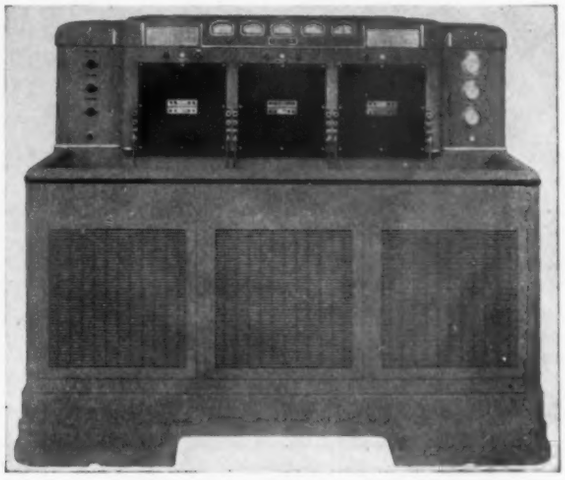


GAS FURNACE—*Despatch Oven Co., Minneapolis, Minn.* Controlled combustion furnaces are made in four standard sizes, and in special sizes. They are available in temperature ranges up to 1250 F. Vol. 84, p. 796.

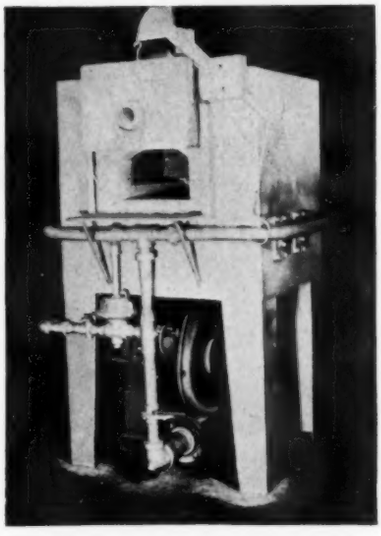
Furnaces—WELDING, HEAT-TREATING, CLEANING and FINISHING



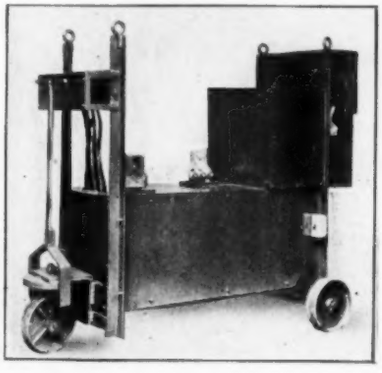
SALT BATH FURNACE—*Ajax Electric Co., Frankford Ave. & Allen St., Philadelphia, Pa.* Brazing and heating for forging are possible with the "Ajax-Hulgren" electric salt bath furnace. No heating elements are used. Electromagnetic forces provide constant forced circulation and insure uniform temperature. Vol. 84, p. 794.



INDUCTION HARDENER—*Ohio Crankshaft Co., 6600 Clement Ave., Cleveland, Ohio.* Available in capacities of 10, 20, 40, 60 and 80 kva., Type MG 10 "Tocco Jr." induction hardening machine surface hardens many small parts with the use of simple fixtures. Unit is furnished complete with automatic cycle control. Vol. 84, p. 795.



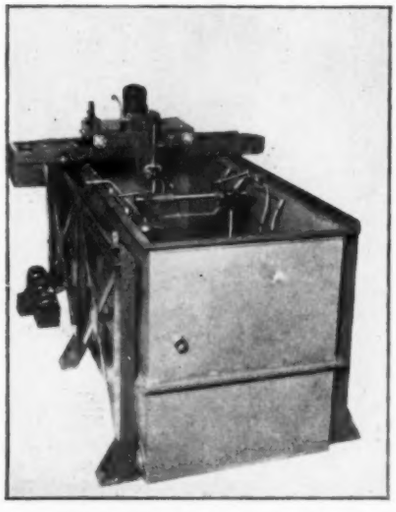
TOOL FURNACE—*Mahr Mfg. Co., Div. of Diamond Iron Works, Inc., Minneapolis, Minn.* This 12x18x6-in. gas underfired furnace is equipped with four premixed gas burners arranged for single-valve control. Vol. 84, p. 795.



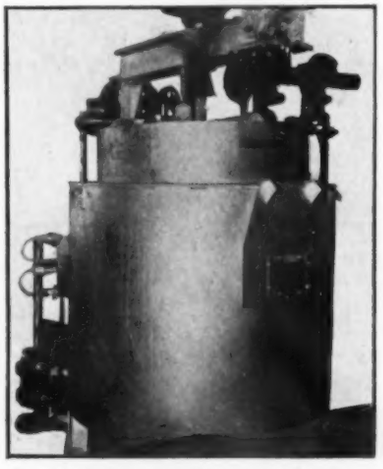
HYSTERESIS HEATER — *Electric Arc Cutting & Welding Co., 152–156 Jelliff Ave., Newark, N. J.* The Smith-Dolan induction hysteresis preheating-welding-normalizing system is suitable for field work on pipe and special pressure vessel connections, and for similar work in the shop. Vol. 84, p. 781.

ELECTRIC FURNACE — *Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa.* Increased production and fewer rejections are claimed for an electric furnace for bright-hardening high-carbon and alloy steel. A continually moving conveyor passes through an inert "Endogas" mixture which prevents decarburization. Vol. 84, p. 795.

PRESSURE CONTROLLER — *Leeds & Northrup Co., 4934 Stenton Ave., Philadelphia, Pa.* Flexibility of installation, convenience of operation and ease of adjustment are stressed in a completely redesigned industrial furnace pressure controller. Vol. 84, p. 850.

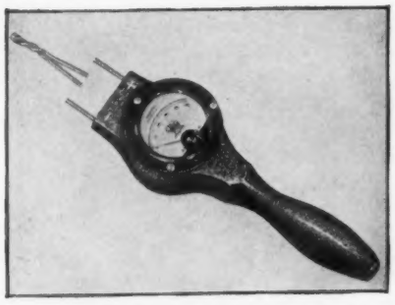


FLAME HARDENER—*Celtic Works, Shorter Process Co., Ltd., Savile Street East, Sheffield, 4, England.* No. G2 surface hardening machine features infinitely variable speed control, a special cam-type twin gas control valve and fixtures for hardening gears and shafts. Vol. 84, p. 435.

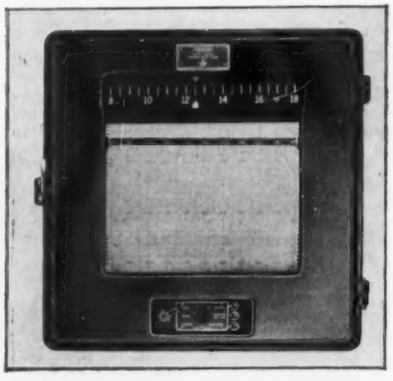


GAS CARBURIZING FURNACE — *General Electric Co., Schenectady, N. Y.* This gas-carburizing electric furnace for case-hardening steel parts is claimed to offer outstanding advantages over other methods of carburization. Furnace can be controlled automatically. Vol. 84, p. 1100.

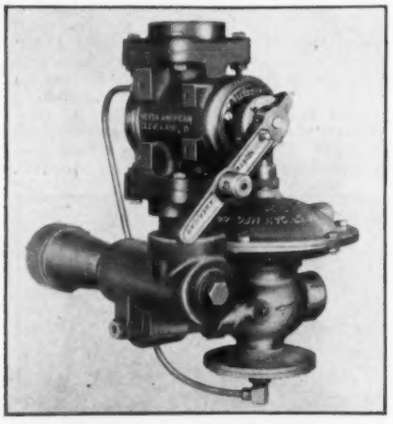
WELDING, HEAT-TREATING, CLEANING and FINISHING—Pyrometers



PYROMETER—*Russell Electric Co., 343 W. Huron St., Chicago, Ill.* Improved "Hold-Heet" pyrometer is available with a black finish impervious to oil. No battery or electrical connections are necessary. Vol. 84, p. 36.

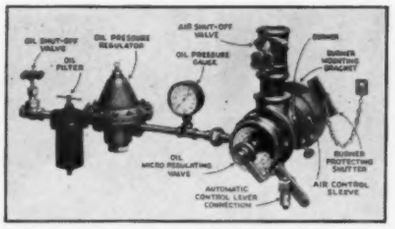


POTENTIOMETER CONTROLLERS —*Foxboro Co., Foxboro, Mass.* Air-operated potentiometer recording controllers feature improved detecting mechanism, new integral recording and controlling mechanism, and new control system to provide maximum flexibility. Accuracy is 0.25 per cent of scale range. Vol. 84, p. 34.

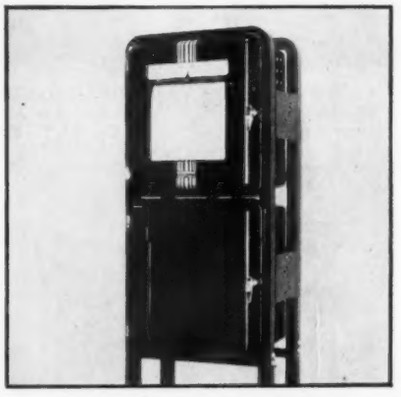


MIXTURE PROPORTIONER — *North American Mfg. Co., 2910 E. 79th St., Cleveland, Ohio.* Constant proper mixture proportion is obtained with the air-gas "Ratiotrol." Series 45 units are available in six sizes. Vol. 84, p. 72.

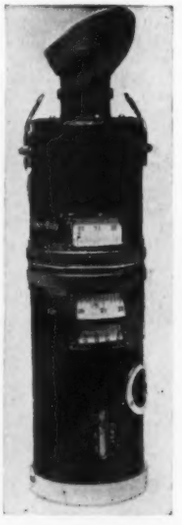
THERMOCOUPLE—*General Electric Co., Schenectady, N. Y.* Radiation-type vacuum thermocouple (not shown) provides high sensitivity and rapid response. It is designed especially for controlled protective-atmosphere furnaces. Temperatures higher than 1,500 C. can be handled by the addition of screens between the thermocouple and the heat. Vol. 84, p. 116.



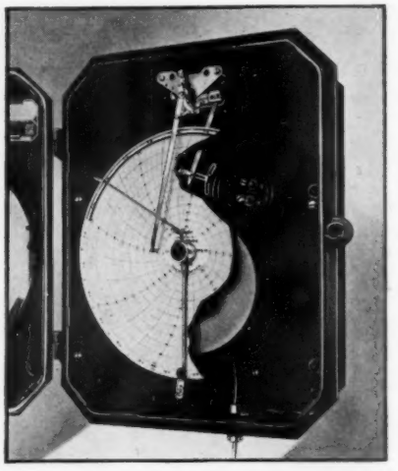
PROPORTIONING BURNER — *Hauck Mfg. Co., 121 Tenth St., Brooklyn, N. Y.* This proportioning oil burner requires no extra valves and is furnished ready to hook up to control equipment for accurate combustion and temperature control of oil-fired furnaces and ovens. Vol. 84, p. 34.



RECORDING PYROMETER—*Leeds & Northrup Co., 4934 Stenton Ave., Philadelphia, Pa.* High-speed recording with dependability and freedom from attention is possible with the redesigned and simplified "Speedomax" pyrometer. This instrument draws a continuous curve of moving billet, slab or rail temperature. It is available in a number of different ranges between the limits of 650 and 3300 F. Chart speed may be either 4 in. per hr. or 2 in. per min. Vol. 84, p. 224.

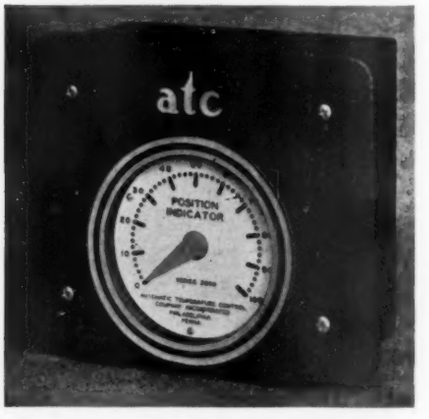


PYROMETERS — *Pyrometer Instrument Co., 103 Lafayette St., New York, N. Y.* "Bi-Optical" pyrometer, illustrated, a totally self-contained direct reading instrument, permits accurate readings by simultaneous measurement of black body and actual or color temperatures. It is furnished with scales from 950 to 2,000 C., or from 1,800 to 3,600 F. "Micro-Optical" pyrometer (not shown) measures temperatures of very small objects. It is furnished with scale ranges of 600 to 1,600 C., 1,600 to 3,000 C., and 3,000 to 4,000 C. Vol. 84, p. 797.



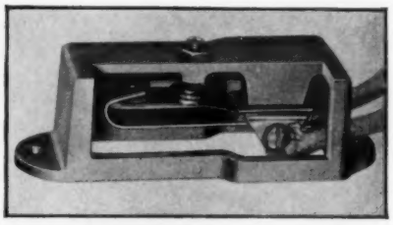
RECORDERS — *Taylor Instrument Cos., Rochester, N. Y.* "Fulscope" recorders for temperature, humidity, pressure, load, rate of flow, liquid level, etc., are sealed from dust and moisture by Neoprene door gaskets. A specially designed mechanism combines chart locking device and pen lifter to reduce time required for changing charts. Vol. 84, p. 349.

PYROMETER — *Brown Instrument Co., Div. of Minneapolis-Honeywell Regulator Co., Philadelphia, Pa.* "Radiamatic" pyrometer measures and controls temperature where thermocouples are impractical. It is sighted on hot object, moving or still, and continuously measures temperature. It withstands vibration, dust, dirt, fumes and corrosive atmospheres. Vol. 84, p. 798.



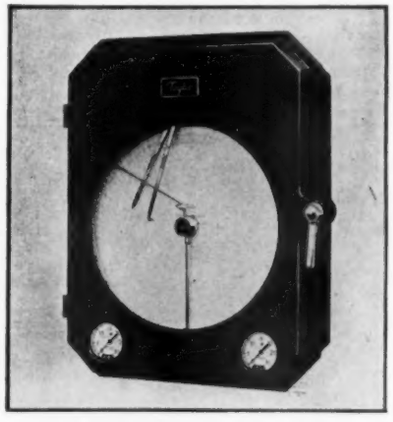
POSITION INDICATOR—*Automatic Temperature Control Co., 34 E. Logan St., Philadelphia, Pa.* This position indicator operates on the Wheatstone Bridge principle. It cannot get out of step with the transmitter or change its pointer's position in case of power failure. Vol. 84, p. 797.

Instruments—WELDING, HEAT-TREATING, CLEANING and FINISHING

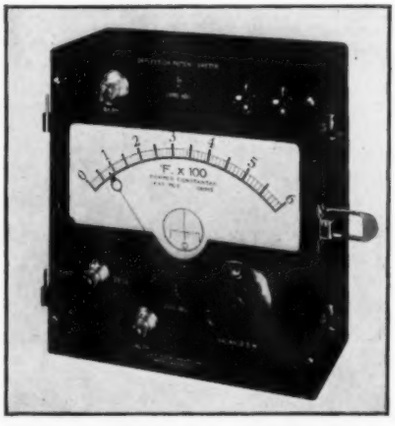


THERMOSTAT—*George Ulanet Co., 89 Kinney St., Newark, N. J.* "UL" strip thermostat controls temperatures of electrically heated flat surfaces. Capable of handling 1,500 watts at 115 or 230 volts a.c., units are available with maximum operating temperatures of 300, 450 and 700 F. Dimensions: 4½x1½x1¼ in. Vol. 84, p. 950.

INDICATOR—*C. J. Tagliabue Mfg. Co., Park & Nostrand Aves., Brooklyn, N. Y.* "Celectray" self-balancing multiple-point indicator takes many temperature readings in minimum time without personal errors. With the fastest model, readings can be taken every few seconds. Vol. 84, p. 798.



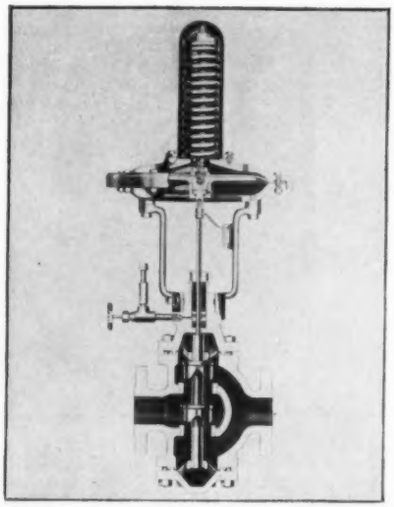
CONTROLLERS—*Taylor Instrument Cos., Rochester, N. Y.* "Fulscope" air-operated recording and indicating controllers for temperature, pressure, rate of flow and liquid level combine in one instrument the conventional proportional response and automatic reset forms of control and introduce a third process-control effect, "Pre-Act." Vol. 84, p. 265.



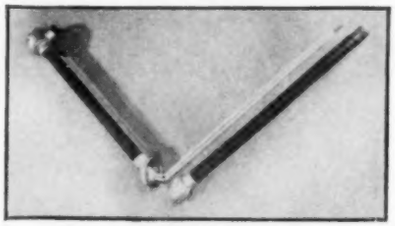
POTENTIOMETER PYROMETER—*J-B-T Instruments, Inc., 441 Chapel St., New Haven, Conn.* Model 70-PO portable potentiometer-pyrometer for measurement of temperature by thermocouples is designed to withstand vibration and adverse conditions of ambient temperature. It weighs less than 5¼ lb., and uses only a flashlight cell. Vol. 84, p. 395.

PYROMETER CONTROLLER—*Bristol Company, S. Main St., Waterbury, Conn.* Moving parts in the control circuit are eliminated in this electronic pyrometer controller (not shown). "Millivac" relay makes control extremely sensitive to temperature changes at the thermocouple. Vol. 84, p. 556.

ELECTRODE—*Lincoln Electric Co., 12818 Coit Rd., Cleveland Ohio.* "Planeweld" arc welding electrode (not shown) is especially made for welding SAE 4130 and X-4130 chrome-molybdenum steels. It is suitable for welding in all positions. It comes in two types, No. 1 for material 0.120 in. thick and heavier, and No. 2 for light gage airplane parts and tubing. Vol. 84, p. 1051.

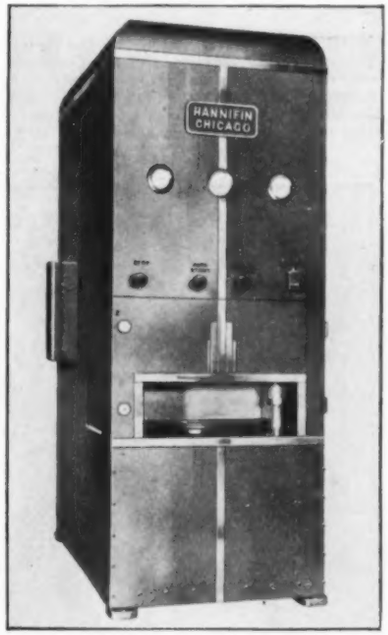


CONTROL VALVES — *Foxboro Co., Foxboro, Mass.* Improved "Stabilflo" control valve responds accurately to control instrument without sacrifice of rugged construction. Equipped with a wide-range V-port plunger, it has a rangeability of 50:1. Vol. 84, p. 230.



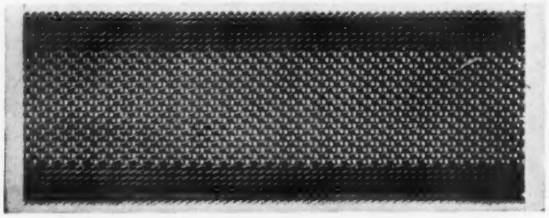
THERMOCOUPLE FITTING—*Leeds & Northrup Co., 4934 Stenton Ave., Philadelphia, Pa.* A universal union for angle-type thermocouples facilitates replacement. Vol. 84, p. 996.

HEAT-TREATING GAS — *General Electric Co., Schenectady, N. Y.* "Drycolene" atmosphere gas (not shown) for heat-treating steels without surface decarburization makes possible such operations as scale-free hardening, bright annealing, sintering and electric furnace brazing of high-carbon steels where decarburization, carburization or oxidation cannot be permitted. It is made in a special gas producer. Vol. 84, p. 797.

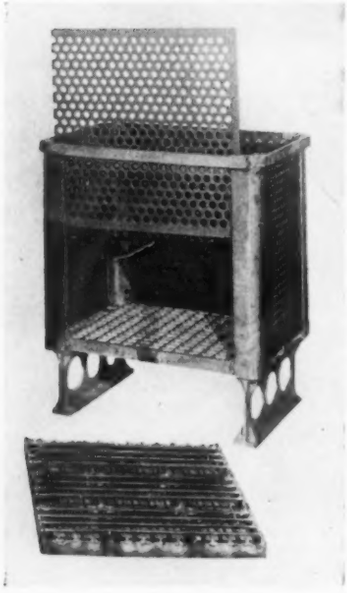


CENTRIFUGAL QUENCHER—*Hannifin Mfg. Co., 621–631 S. Kolmar Ave., Chicago, Ill.* Designed for handling many types of circular parts, this centrifugal quenching machine is claimed to avoid distortion and save 80 per cent of quenching time. Machine provides closely controlled time of quenching, volume of quenching medium, and temperature of medium. Vol. 84, p. 993.

WELDING, HEAT-TREATING, CLEANING and FINISHING—Welders



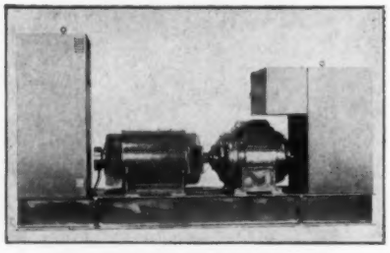
WIRE BELT—*Cambridge Wire Cloth Co., Cambridge, Md.* This duplex selvage wire belt is claimed to reduce furnace operating cost. It is made in a variety of meshes and wire gage combinations, in various alloys for temperatures up to 2,100 F. Vol. 84, p. 798.



NORMALIZING BASKET—*Driver-Harris Co., Harrison, N. J.* "Nichrome" (60 per cent nickel-13 per cent chromium) normalizing basket has been specially produced for heat-treatment of Garand rifle barrels. Vol. 84, p. 796.

INSULATION — *Johns-Manville, 22 East 40th St., New York, N. Y.* A 1,500-deg. insulating material, "L-W Superex" (not shown) provides improved insulation and strength characteristics. It is of the molded diatomaceous silica type, weighing only 20 lb. per cu.ft. Vol. 84, p. 796.

FIRE BRICK—*Armstrong Cork Co., Lancaster, Pa.* A system of color spots identifies four types of high temperature insulating fire brick (not shown). Vol. 84, p. 797.

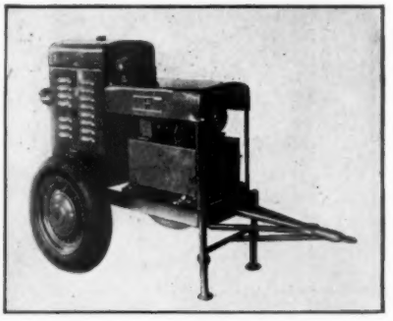


ARC WELDER—*General Electric Co., Schenectady, N. Y.* Redesign of the 1,500-amp. constant-potential arc-welding set for multiple operator and machine welding has provided more compact construction, lighter weight, improved appearance and greater ease of installation. Vol. 84, p. 34.

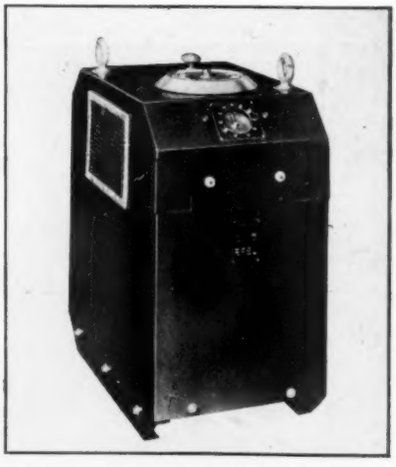
RELAY—*Automatic Temperature Control Co., 3½ E. Logan St., Philadelphia, Pa.* This balancer relay is suitable for proportioning type fuel control systems for close maintenance of furnace temperature. Among its features are automatic load compensation, full anticipation when coming up to heat, adjustable throttling range and adjustable rate of reset. Vol. 84, p. 948.

ARC WELDERS—*Ergolyte Mfg. Co., 3644 Lawrence St., Philadelphia, Pa.* In two continuous a.c. arc welders all controls and sockets have been brought into full view. No. 160 model has a current range of 15 to 160 amp. No. 250 welder shown has a current range of 15 to 250 amp. Vol. 84, p. 555.

RESISTANCE WELDER—*Bear Mfg. Co., Rock Island, Ill.* "Arcmaster" a.c. welder has a multiple-coil transformer. It is claimed to make possible constant welding voltage. Unit is furnished in three models with ranges of 10–200, 10–250 and 10–300 amp. Vol. 84, p. 520.

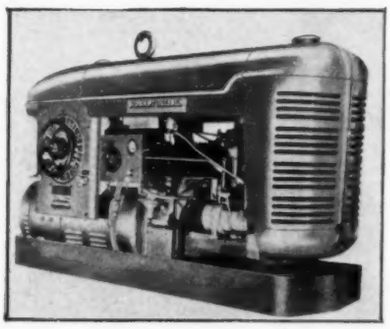


HEAVY-DUTY WELDER — *Comet Products Co., Chappaqua, N. Y.* This portable heavy-duty arc welder can be used for mass production welding on a 24-hr. basis. It is offered in 150, 200 and 300 amp. capacities driven by an air or water cooled gasoline or diesel engine. Vol. 84, p. 395.



ARC WELDERS—*Glenn-Roberts Co., 1009 Fruitvale Ave., Oakland, Calif.* two single-transformer heavy-duty arc welding sets, listed as Models G-R 38 and G-R 45, have ranges of 75 to 425 amp. and 90 to 600 amp. They are designed for continuous heavy-duty service and feature infinitely variable heat control which provides full-range regulation of output current without altering either arc or open-circuit voltage. Vol. 84, p. 67.

Welders—WELDING, HEAT-TREATING, CLEANING and FINISHING



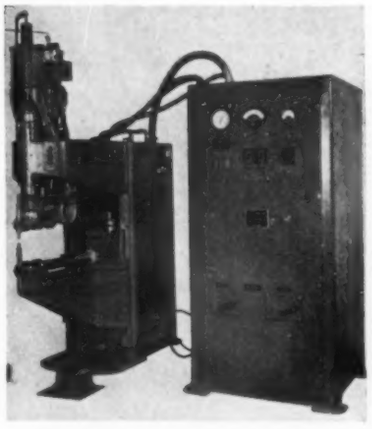
WELDER—*Hobart Bros. Co., Hobart Square, Troy, Ohio.* 1,000 combinations of voltage and current are possible from the 200-amp. "Streamliner Junior" arc welder. Powered by a 26-hp. Hercules gas engine, this Model GR-202-S welder is particularly suitable for job welding shops, blacksmiths, repair shops, garages and miscellaneous metal-workers. Vol. 84, p. 687.

ARC WELDER—*General Electric Co., Schenectady, N. Y.* A 300-amp. a.c. arc welder incorporates power factor correction. Smaller primary cables, line switches and fuses can be used. It is only 43 in. high and 21 in. in diameter. Vol. 84, p. 799.

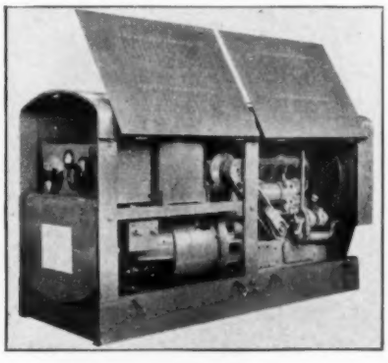
ARC WELDER—*General Electric Co., Schenectady, N. Y.* A d.c. arc welder which provides any current from 25 to 250 amp. allows all-day manual welding to be done with currents up to 200 amp., using electrodes from $\frac{1}{16}$ to $\frac{5}{16}$ in. in diameter. Vol. 84, p. 799.

PORTABLE WELDER—*Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa.* A portable a.c. welder designed for all-round general utility service and production welding operates on 220 or 440 volts and is completely self-contained. From 20 to 250 amp. of welding current is available in 27 steps. Vol. 84, p. 642.

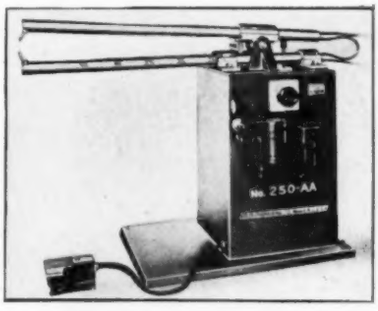
ARC WELDERS—*K. O. Lee & Son, Aberdeen, S. D.* Improved arc welders, consisting of 150, 200 and 250 amp. models, have from 4 to 6 more taps. Straight holes with spring pressure plugs are used. Vol. 84, p. 70.



SPOT WELDER — *Taylor-Winfield Corp., Warren, Ohio.* "Hi-Wave" spot welder is said to produce welds in aluminum alloys of a quality which cannot otherwise be duplicated. It is also applicable to steel and non-ferrous metals. Power demand is roughly 10 per cent of that of conventional welders. Vol. 84, p. 800.



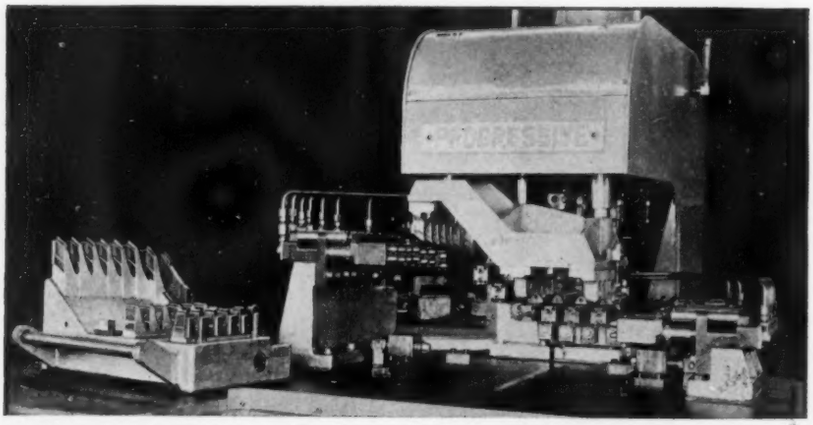
DIESEL WELDER—*Lincoln Electric Co., 12818 Coit Rd., Cleveland Ohio.* Application of gasoline engine starting to diesel-driven arc welders has been extended to include the 400-amp. model. Vol. 84, p. 646.



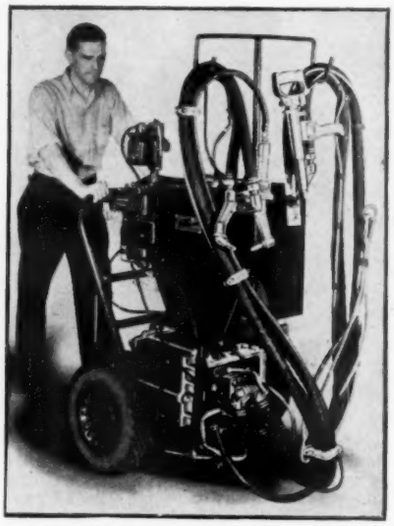
SPOT WELDER—*Eisler Engineering Co., 745 S. 13th St., Newark, N. J.* On this No. 250 AA long-horn spot welder both upper and lower horns can be lengthened or shortened. Markings on the horn represent kva. ratings. Model illustrated is a 25–50 kva. air-operated welder. Cooling water goes through entire horn. Vol. 84, p. 780.

WELDING FIXTURE — *Progressive Welder Co., 3001 E. Outer Dr., Detroit, Mich.* A combination of short-circuiting gun and clamping fixture is used for making spot welds in semi-inaccessible locations where intricately shaped, thin section welding points could not stand up. Vol. 84, p. 150.

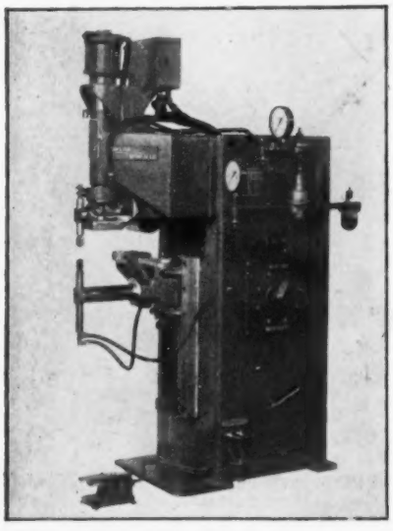
WELDING, HEAT-TREATING, CLEANING and FINISHING—Spot Welders



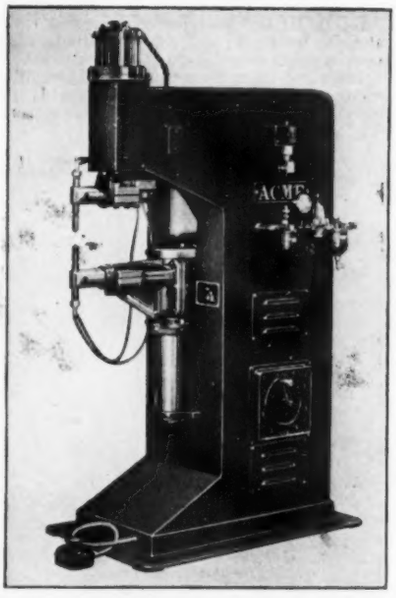
WELDING FIXTURE—*Progressive Welder Co., 3001 E. Outer Drive, Detroit, Mich.* Use of rubber-tired movable jig fixtures which form the lower electrodes during welding enables some 1,000 stampings to be assembled with 4,000 spot welds into 100 complete radiator grille halves per hour. Vol. 84, p. 940.



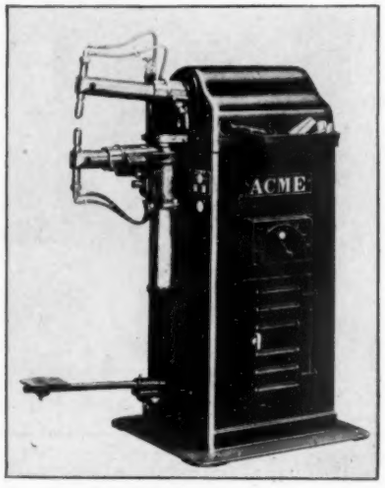
PORTABLE WELDER—*Progressive Welder Co., 3001 E. Outer Drive, Detroit, Mich.* This two-gun portable spot welding unit is designed for heavy-duty welding requiring high point pressures. Vol. 84, p. 522.



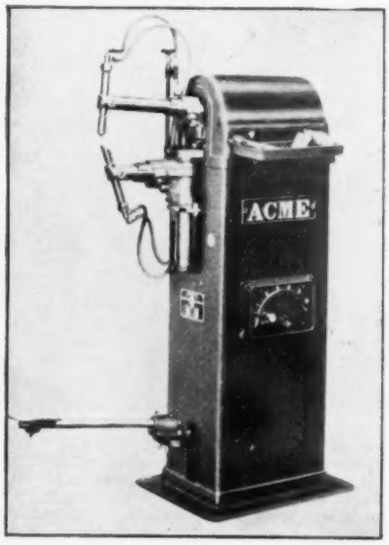
SPOT WELDER — *Taylor-Winfield Corp., Warren, Ohio.* A combination lower horn and knee, placed 90 deg. apart on a common casting, is featured in this adaptation of a standard Type EN press-type welder. Machine has throat depths up to 30 in. and capacities from 30 to 75 kva. Vol. 84, p. 438.



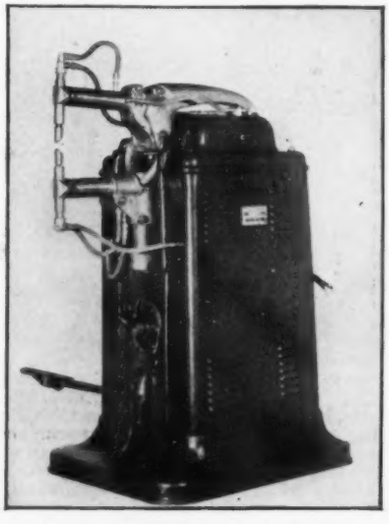
SPOT WELDER — *Acme Electric Welder Co., 5621–23 Pacific Blvd., Huntington Park, Calif.* Type PT-1 air-operated spot welders are made in capacities from 30 to 150 kva. Throat depths range from 12 to 48 in. Vol. 84, p. 1101.



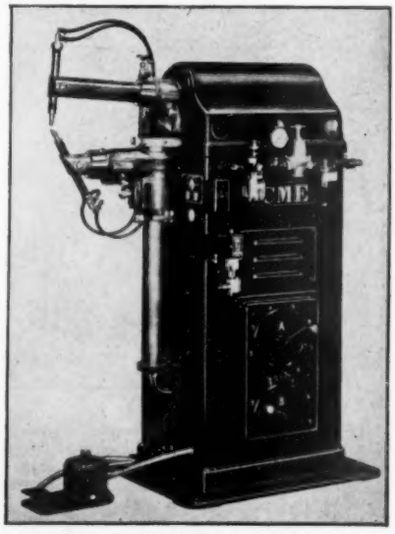
SPOT WELDERS—*Acme Electric Welder Co., 5621–23 Pacific Blvd., Huntington Park, Calif.* "Hot Spot" welders are made in rocker arm types, 20 to 50 kva. capacities. Vol. 84, p. 842.



SPOT WELDERS—*Acme Electric Welder Co., 5621–23 Pacific Blvd., Huntington Park, Calif.* Type O "Hot Spot" welder with stationary lower horn holder and Type 1 with swivel lower horn holder are manufactured in 10, 15 and 20 kva. capacities, throat lengths from 12 to 36-in. Vol. 84, p. 639.



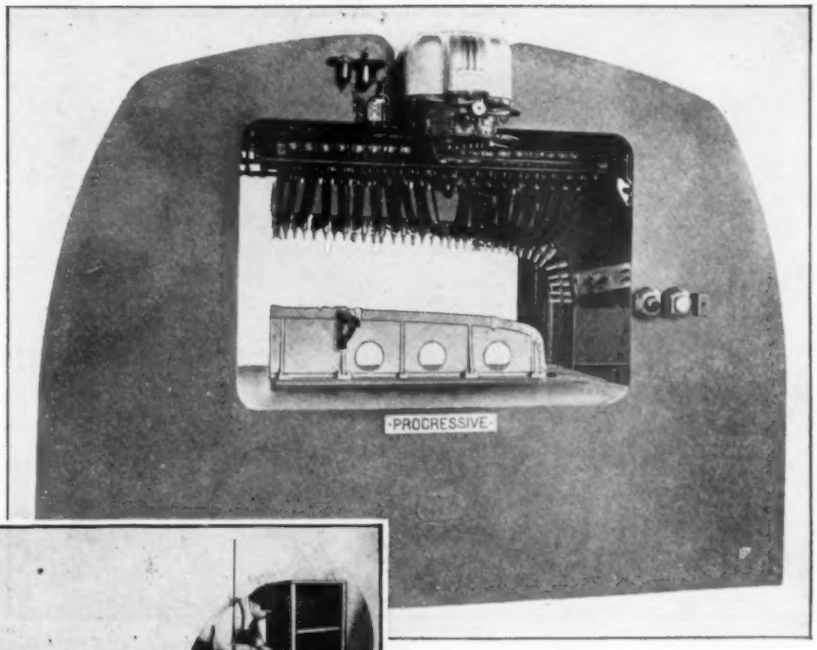
SPOT WELDERS—*American Electric Fusion Corp., 2610 Diversey Ave., Chicago, Ill.* Either of two transformers can be housed in the three frame sizes provided in this line of spot welders. Thus capacities of 10, 15, 20, 30, 40 and 50 kva. are obtained. Vol. 84, p. 550.



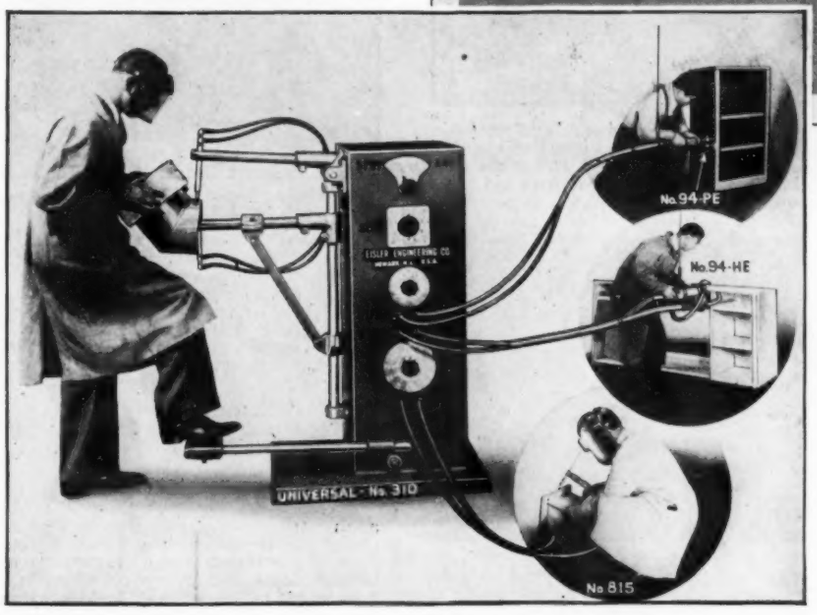
SPOT WELDER — *Acme Electric Welder Co., 5621–23 Pacific Blvd., Huntington Park, Calif.* From 6 to 48 heats are available on the Type 3 "Hot Spot" welder. Available in Vol. 84, p. 937.

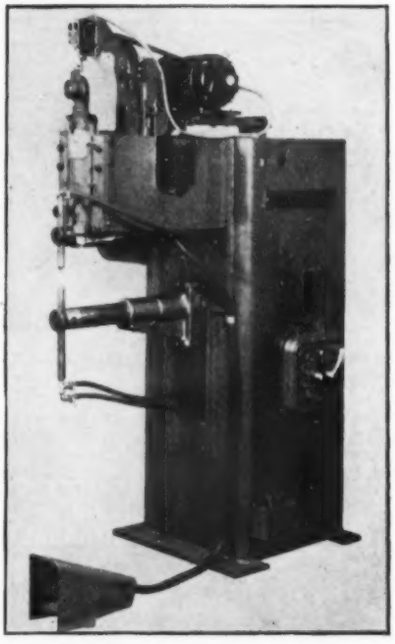
Welders—WELDING, HEAT-TREATING, CLEANING and FINISHING

SPOT WELDER—*Progressive Welder Co., 3001 E. Outer Drive, Detroit, Mich.* Capable of making upwards of 6,000 welds per hour, "Progress-O-Matic" high-speed spot welder uses a method of current transfer which makes and breaks the secondary as well as the primary circuit, thus giving the machine such flexibility of operation that it can weld an assembly having several thicknesses of metal. All welding points are brought down on the work under full pressure and held there throughout the entire cycle. Only one transformer is required. Completely automatic cycle is used. Vol. 84, p. 638.



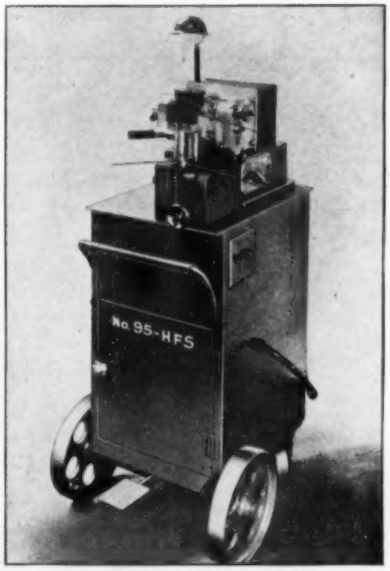
UNIVERSAL WELDER—*Eisler Engineering Co., 745 S. 13th St., Newark, N. J.* No. 310 universal spot welder is suited for welding all kinds of sheet metal. In addition, it can be used as an a.c. transformer-type arc welder, as a hand-operated push type spot welder, or as an air-operated gun welder. It is available with four sizes of spot welder, from 10 to 50 kva., and with 200, 300 and 400 amp. arc units. Vol. 84, p. 310.





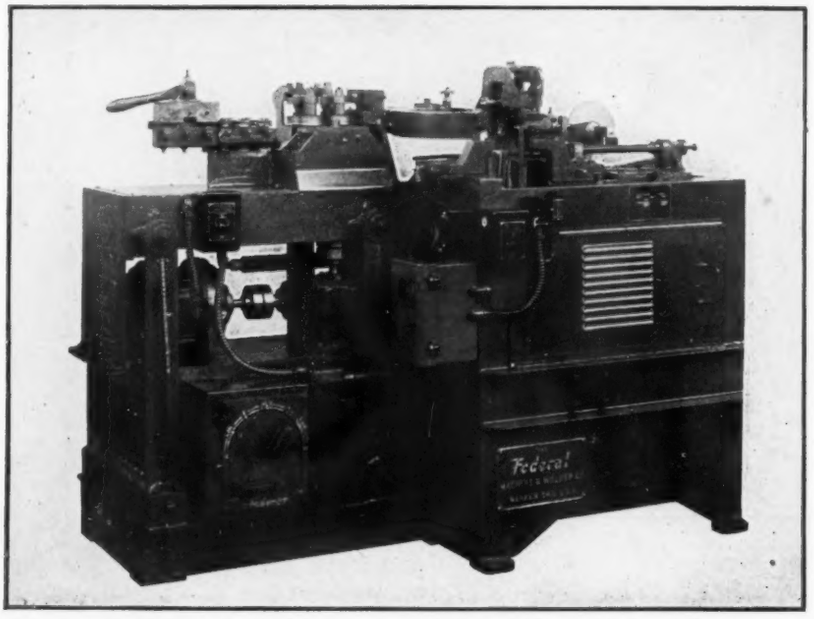
WELDING PRESS — *Thomson-Gibb Electric Welding Co., 164 Pleasant St., Lynn, Mass.* Interchangeability of essential parts on the 1940 Model No. 1 welding press makes it possible to remodel the machine to suit new requirements with minimum expense. Fabricated steel frame is reinforced to minimize deflection. Sliding head moves with straight line action in adjustable gibbed ways. It is actuated by a cam designed to slow down the electrode as it approaches the work. Variable pulley driven by a ½-hp. motor provides infinite speed selection between 36 to 109 or 44 to 133 strokes per min. Press operates at electrode pressures up to 1,000 lb. This applies to units with 12, 18, 24 or 30-in. standard throat depths. Transformer ratings are 30, 40, 50 and 75 kva. Vol. 84, p. 516.

SPOT WELDER—*Eisler Engineering Co., 745 S. 13th St., Newark, N. J.* This 5-kva. high-speed production spot welder is air operated and produces 150 welds per min. Vol. 84, p. 392.

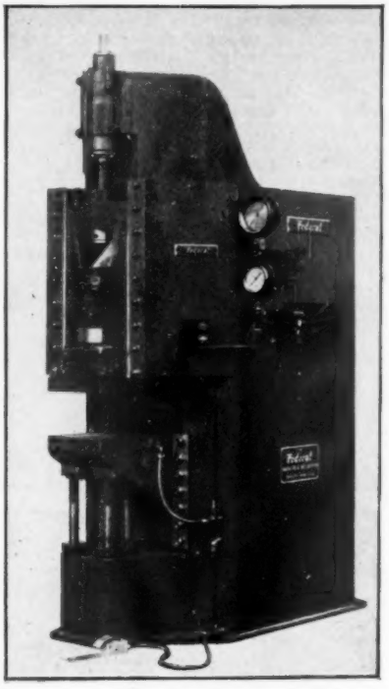


BUTT WELDER—*Eisler Engineering Co., 740 S. 13th St., Newark, N. J.* This portable butt welder with a burr grinder and annealer is especially suitable in the repair of stranded wire. By fusing all strands, the ends are prevented from raveling. Machine is supplied with a 3-kva. air-cooled transformer and an 8-inch switch. Vol. 84, p. 644.

WELDING, HEAT-TREATING, CLEANING and FINISHING—Welders

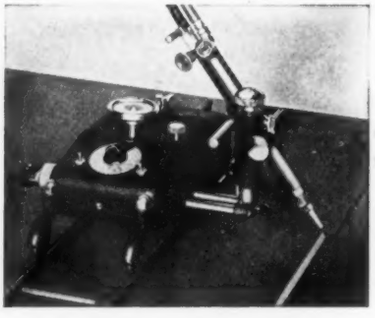


HOOP WELDER—*Federal Machine & Welder Co., 212 Dana Ave., Warren, Ohio.* This automatic machine takes wire from a supply reel at a uniform speed of approximately 150 to 175 ft. per min., straightens it, forms hoops, and then welds the ends together. Rings are held to within 0.005 in. in diameter and are flat within 1/6 in. From 1,500 to 1,800 hoops per hour are produced. Vol. 84, p. 437.

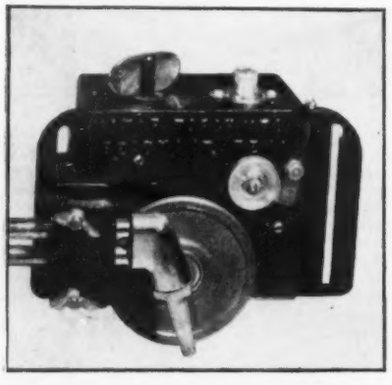


PROJECTION WELDER — *Federal Machine & Welder Co., 212 Dana Ave., Warren, Ohio.* This heavy-duty projection welder may be furnished for hydraulic, air or motor operation. Illustrated is the direct hydraulically operated Model P-4. This machine is offered in five transformer capacities from 250 to 600 kva. Cooling facilities are provided in the secondaries, platens and electrodes. Vol. 84, p. 687.

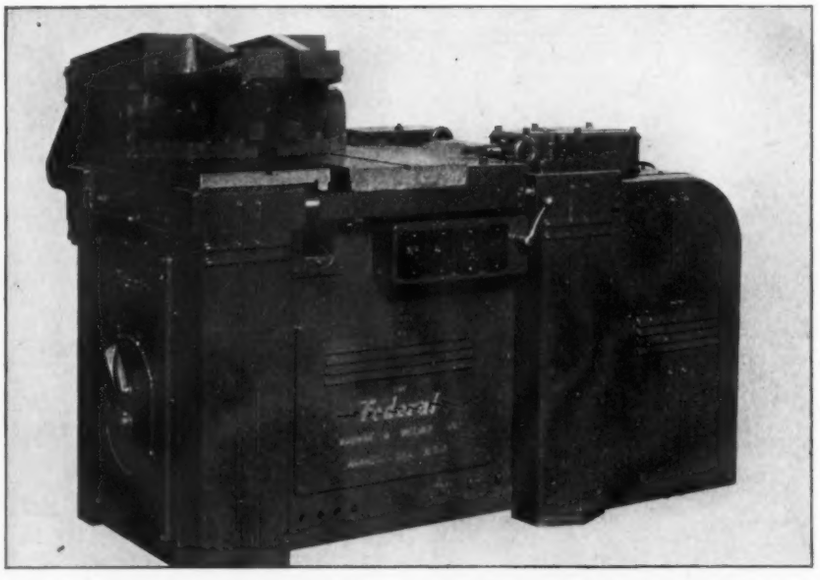
BANDSAW WELDER—*Stone-Ryals Electric & Mfg. Co., 470 Natoma St., San Francisco, Calif.* "Stryco" bandsaw flash welder is entirely inclosed. Type M.F. welders incorporate complete automatic action and control. No. M.F.4 unit shown is rated at 4 kw., for 1-in. blades. No. M.F.6, rated at 6 kw., will take 2-in. blades. Vol. 84, p. 265.



GAS CUTTING MACHINE—*Harris Calorific Co., Cleveland, Ohio.* Model K portable motor-driven gas-cutting machine has a low chassis and underslung torch holder to eliminate vibration and assure true cuts. Powered by a universal electric motor, it will cut straight lines of any length with either square or beveled edges and will cut circles from 1 to 86 in. in diameter. Machine has a speed range of from 3 to 60 in. per min., forward and reverse. Mounting for two torches is provided. Vol. 84, p. 779.

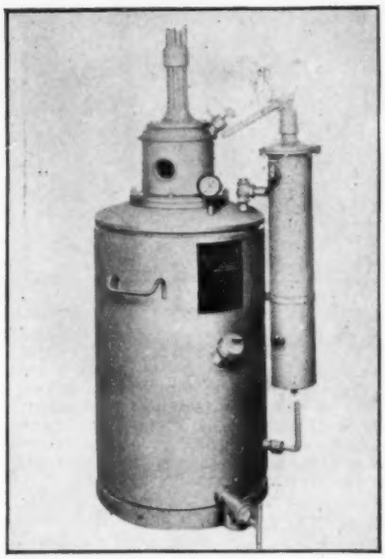


PORTABLE CUTTING MACHINE—*Motor Torch Mfg. Co., P.O. Box 1571, Beaumont, Tex.* This portable, compact head is adaptable to any make of oxy-acetylene cutting torch. Self-contained power unit requires no electrical connection. Speed is variable. Straight lines, bevels, and curves can be cut in all positions. No jigs or fixtures are required. Unit is 7¾ in. long, 3 in. wide, 7 in. high. It weighs 7 lb. Vertical adjustment is 4 in. Vol. 84, p. 520.

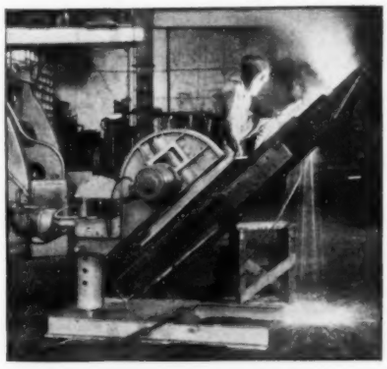


FLASH WELDER—*Federal Machine & Welder Co., 212 Dana St., Warren, Ohio.* Maximum protection of operating parts without sacrificing accessibility is an outstanding design feature of the Type F-4 flash welder. This machine is made in transformer capacities up to 150 kva., suitable for welding stock having up to 1 sq.in. of welding area. It may be used for round, flat, or formed sections. Vol. 84, p. 778.

Welding Accessories—WELDING, HEAT-TREATING, CLEANING and FINISHING



ACETYLENE GENERATORS—*Marquette Mfg. Co., Minneapolis, Minn.* Four portable acetylene generators range in capacity from 12 to 50 lb. Vol. 84, p. 730.



WELDING POSITIONER—*Cullen-Friestedt Co., 1300 S. Kilbourn Ave., Chicago, Ill.* Model 60 welding positioner has capacity of 6,000 lb. when center of gravity of load is 12 in. from the face of the table and 6 in. to one side of the axis of rotation. Both table tilt and table rotation movements are power-operated. Gears are self-locking in all positions. Vol. 84, p. 28.

EAR PROTECTORS—*Mine Safety Appliances Co., Braddock, Thomas & Meade Sts., Pittsburgh, Pa.* Developed to prevent injury to the ears caused by flying sparks or hot metal particles, these welders' ear protectors are made of close-woven, non-rusting screen with leather binding. Vol. 84, p. 112.

STAINLESS STEEL ELECTRODE—*Lincoln Electric Co., 12818 Coit Rd., Cleveland, Ohio.* "Stainweld D" electrode (not shown) is recommended for arc welding stainless steel of 25 per cent chromium, 20 per cent nickel. It also is used for welding stainless steel to mild steel, and for welding steels which are air hardening and cannot be heat-treated after welding. Vol. 84, p. 115.

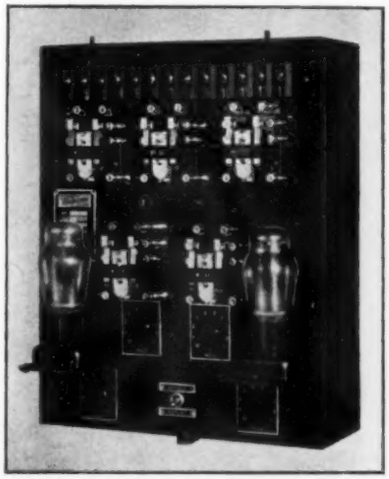
WELDING MATERIAL—*Park Sales Co., 3 Park Place, New York, N. Y.* "Castolin" alloys and fluxes (not shown) can be used for oxy-acetylene welding at low temperatures. Alloys suitable for welding steel, aluminum, brass and bronze are available. Vol. 84, p. 115.

HARD-FACING ROD—*Haynes Stellite Co., unit of Union Carbide & Carbon Corp., Kokomo, Ind.* No. 93 hard-facing rod (not shown) is used where severe abrasion and moderate impact are encountered. This rod has a tensile strength of about 43,000 lb. per sq.in., and a hardness as deposited of 62 Rockwell C. Vol. 84, p. 114.

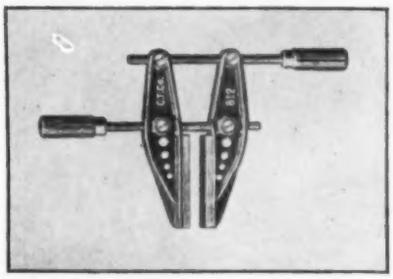
ABRASION-RESISTING ELECTRODES—*Lincoln Electric Co., 12818 Coit Rd., Cleveland, Ohio.* "Faceweld" No. 1 and No. 12 hard facing electrodes (not shown) are cast abrasion-resisting alloys for hard-facing. Both are coated electrodes, having good arc characteristics and producing a smooth, dense deposit. No. 1 is a general purpose electrode which has good abrasion resistance and high impact resistance. No. 12 is somewhat harder and has superior abrasion resistance but lower impact resistance. Vol. 84, p. 270.

WELD TIMER—*Weltronic Corp., 2832 E. Grand Blvd., Detroit, Mich.* Positive control of welding time to a half cycle on any resistance welder is provided by the Model 90-1 timer (not shown). It may be adapted to virtually any standard resistance welder. It is available in 220 to 550 volts, 25, 50 and 60 cycles, 150 to 600 amp. Vol. 84, p. 38.

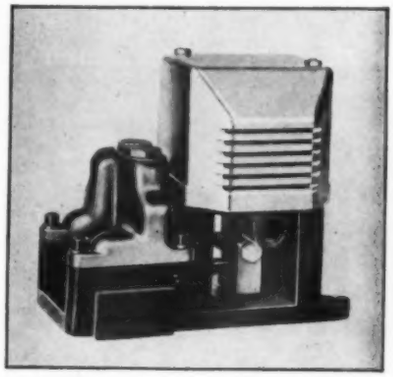
WELDERS' CLAMP—*Cincinnati Tool Co., Norwood, Cincinnati, Ohio.* Available with maximum openings of 4, 6, 8, 10 and 12 in., the No. 43 Hargrave welders' clamp incorporates a spatter-proof screw. Depth of throat ranges from 2½ to 3 in. (Not shown.) Vol. 84, p. 152.



WELDING CONTROL — *Weltronic Corp., 2832 E. Grand Blvd., Detroit, Mich.* Model No. 58-B "Dual-Time" timer accurately controls two spot-welding guns at the same time through a single transformer. Of electronic tube type, it has a separate time control dial for each gun. Timer has a frequency range of 1 to 30 cycles in one-cycle steps for 110, 220 or 440 volt operation. Vol. 84, p. 112.



CLAMP—*Cincinnati Tool Co., Norwood, Cincinnati, Ohio.* No. 812 adjusting clamp has a 10¾ in. jaw length and 5½ x 2 in. wood-faced clamping surfaces. There are five sizes, with openings ranging from 4½ to 12½ in. Vol. 84, p. 114.

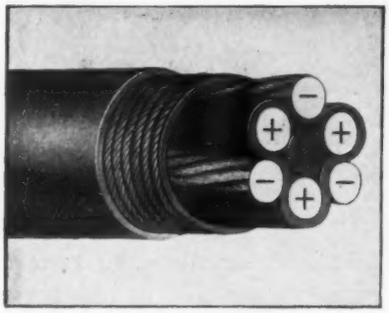


WELDING GUN VALVE—*Ross Operating Valve Co., Detroit, Mich.* A special solenoid-operated air valve has been developed for high-speed operation of welding guns. Vol. 84, p. 228.

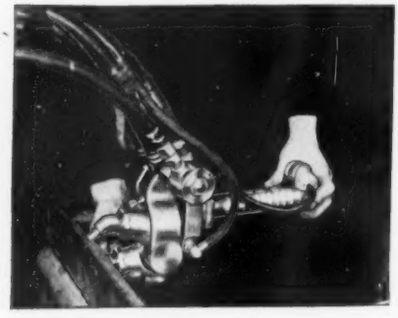
WELDING CURRENT METER—*Weltronic Corp., 2832 E. Grand Blvd., Detroit, Mich.* This glow tube meter (not shown) measures welding current and voltages of such short duration as one cycle on a 60-cycle circuit. It also measures continuous currents and voltages. Vol. 84, p. 272.

WELDING CABLE — *Progressive Welder Co., 3001 E. Outer Drive, Detroit, Mich.* "No-Kik" welding cable combines current conductors, water cooling lines and control cables sheathed in a single seamless rubber covering. It is offered in 250,000, 400,000 and 750,000 c.m. capacities and in 6, 8 and 10 ft. lengths. Vol. 84, p. 227.

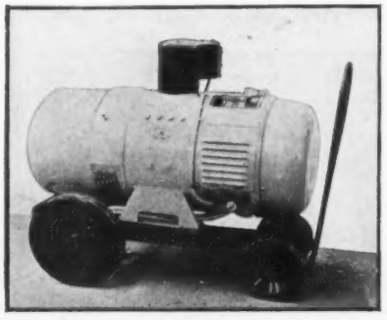
WELDING, HEAT-TREATING, CLEANING and FINISHING—Welding Accessories



WELDING CABLE—*Clark Controller Co., 1146 E. 152nd St., Cleveland Ohio.* This kickless cable consists of a central soft rubber core around which six flexible copper cables are wound. Construction permits free water circulation and provides utmost flexibility. Vol. 84, p. 184.

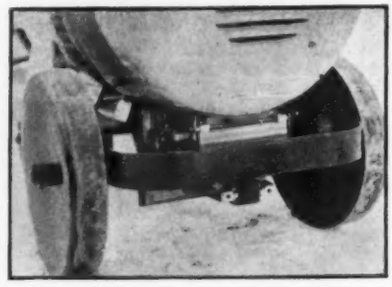


WELDING CLAMP — *Progressive Welder Co., 3001 E. Outer Drive, Detroit, Mich.* This hydraulic welding-cable clamp is said to increase welding gun handling speed, reduce operator fatigue and provide full current transfer for more uniform welds. Cable and gun are locked hydraulically while pressure is on for a weld. The moment pressure is released, the clamp unlocks. Device operates directly from the hydraulic pressure system. It is made in five sizes. Vol. 84, p. 352.

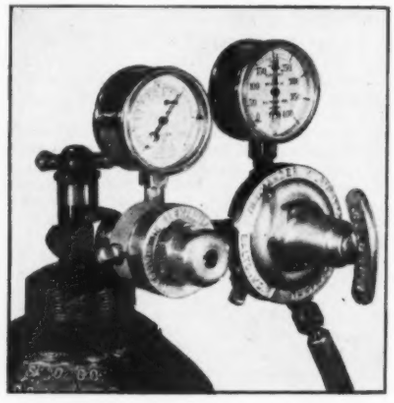


REMOTE WELDER CONTROL—*Wilson Welder & Metals Co., 60 E. 42nd St., New York, N. Y.* Type SC reversible motor driven remote control unit replaces hand-wheel on arc welders. It allows minute adjustments by touching one of two contacts on the electrode holder to ground. Vol. 84, p. 347.

WELDING CAPACITOR — *General Electric Co., Schenectady, N. Y.* This series-capacitor system (not shown) consists of a capacitor connected in series with the transformer primary of the resistance welding machine. This equipment can be applied to spot, projection, seam and butt resistance welding. Vol. 84, p. 404.

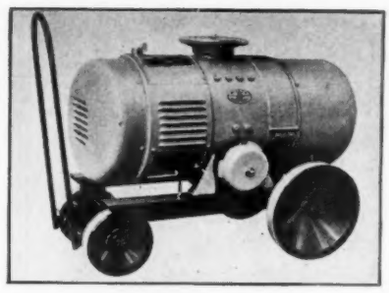


WELDER STARTER—*Wilson Welder & Metals, Inc., 60 E. 42nd St., New York, N. Y.* With this automatic start-and-stop device the operator starts the welding unit simply by touching the work with his electrode holder. As long as he is welding, the unit keeps running; when welding is interrupted, the machine automatically stops after a delay of ½ to 1½ min. Vol. 84, p. 480.



TWIN-STAGE REGULATOR—*Alexander Milburn Co., 1416 W. Baltimore St., Baltimore, Md.* An outstanding advantage of the Type FF "Twin-Stage" regulator is that the first stage can be adjusted to various pressures, thus permitting it to be used for different operations. After the selected pressure is set, the delivery stage may be adjusted to any desired working pressure up to 200 lb. per sq.in. Promoting simplified construction is a unitary valve assembly, used in both stages, which has only four parts. First stage of this regulator can be purchased separately and attached to practically any type of single-stage regulator, converting it to two-stage control. Vol. 84, p. 779.

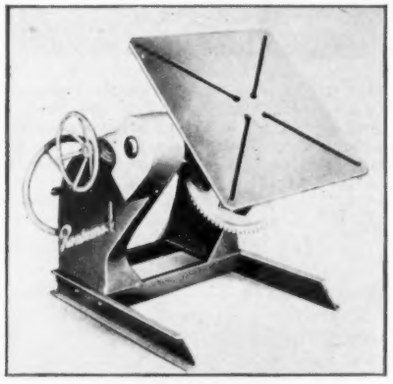
WELDING HELMET—*Sellstrom Mfg. Corp., 615 N. Aberdeen St., Chicago, Ill.* No. 2208 welding helmet weighs only 15 oz. complete with lens and Type AA holder. This holder is interchangeable with other lift-front lens holders, which give the operator a dense lens in the outer holder and a less dense lens in the inner. Vol. 84, p. 446.



WELDER VOLTAGE SWITCH—*Wilson Welder & Metals Co., 60 E. 42nd St., New York, N. Y.* Type CH dual voltage switch is for installation on arc welders when they must be used on either of two line voltages at different times. It can be used on any motor employing alternating current, provided the motor and starter are reconnectable for two voltages. Vol. 84, p. 782.

HARD-FACING ALLOYS—*Wall Colmonoy Corp., 636 Buhl Bldg., Detroit, Mich.* "Colmonoy" No. 4 (not shown) provides a hardness of approximately 35–40 Rockwell C, with an abrasion resistance suitable for repairing die-casting molds, body draw and forming dies. No. 5 is similar to No. 4 but has a hardness of 45–50 Rockwell C. No. 9 combines great hardness and toughness. As applied with the oxy-acetylene flame or as cast, and without heat-treatment, its hardness ranges from 65–68 Rockwell C. Vol. 84, p. 801.

STAINLESS STEEL ELECTRODES—*Crucible Steel Co. of America, 405 Lexington Ave., New York, N. Y.* "Rezistal" stainless steel electrodes (not shown) combine stainless base wire and a coating employing recent developments in flux composition. Six standard types are available, in diameters from $\frac{1}{16}$ to ¼ in., and in 9-, 11-, and 14-in. lengths. Vol. 84, p. 555.

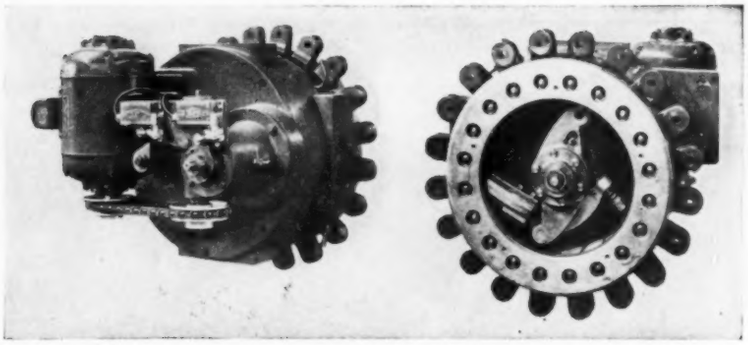


WELDING POSITIONER—*Ransome Concrete Machinery Co., Dunellen, N. J.* In this welding positioner for pieces weighing up to 2,500 lb., an all-welded table top with T-slots for easy clamping revolves a full 360 deg. and tilts 135 deg. beyond horizontal. Vol. 84, p. 1037.

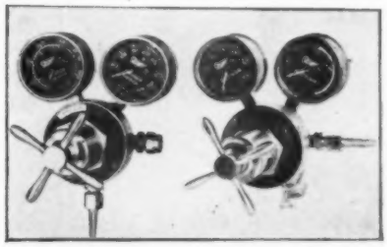
ELECTRODES — *Metal & Thermit Corp., 120 Broadway, New York, N. Y.* "Murex" heavy coated electrodes (not shown) for high-strength, low-alloy steels such as Cor-Ten, Man-Ten, Sil-Ten, Mayori, Republic Double Strength, nickel steels and stainless steels, operate at unusually high amperages with minimum spatter. Vol. 84, p. 801.

ELECTRODES—*Page Steel & Wire Div., American Chain & Cable Co., Monessen, Pa.* Page-Allegheny stainless steel welding electrodes (not shown) coated with formula No. 473–22 hold a smooth arc with practically no spatter. Vol. 84, p. 799.

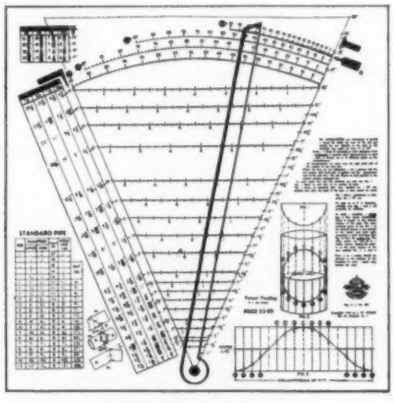
Welding Accessories—WELDING, HEAT-TREATING, CLEANING and FINISHING



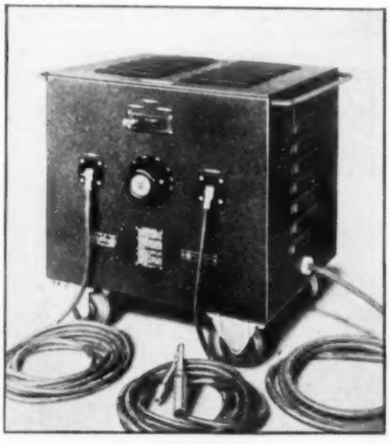
WELDER SWITCH—*Taylor-Winfield Corp., Warren, Ohio.* "Ultraspeed" rotary welder switch shortens welding cycle by returning to its starting position by virtue of its circular construction. Welds are made while the brush is stationary. Device stops after a complete cycle. Vol. 84, p. 800.



GAS REGULATORS—*Linde Air Products Co., 30 E. 42nd St., New York, N. Y.* Three single-stage, general service regulators have been added to the "Oxweld" line. R-80 oxygen regulator for delivery of oxygen at working pressures up to 200 lb., the R-81, its companion acetylene regulator, and the R-82 fuel gas regulator, feature simplicity and reliability. Vol. 84, p. 738.



ANGLE METER—*Interstate Sales Co., 1123 Broadway, New York, N. Y.* "Wolfe" angle meter saves time in marking pipes for cutting at odd angles. Adaptable to any angle from 0 to 90 deg. in steps of 1 deg., on diameters from 1 to 20 in., this device measures only 12x4½ in. when folded. Vol. 84, p. 898.



ARC WELDER—*Allis-Chalmers Mfg. Co., Milwaukee, Wis.* "Weld-O-Tron Junior" low-current electronic arc welder for light gage metals has a capacity of 5 to 40 amp. It supplies currents as low as 5 amp. and uses electrodes as small as $\frac{1}{32}$ in. in diameter. Vol. 84, p. 1035.

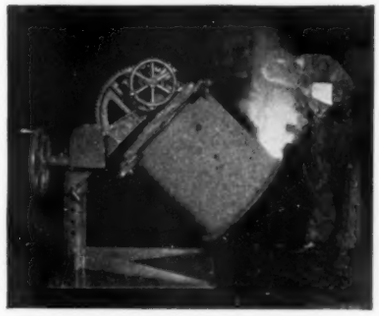
WELDING TIMER—*Weltronic Corp., 2832 E. Grand Blvd., Detroit, Mich.* Resistance forge welding is made possible through special Model 79 electronic timer (not shown). This timer provides accurate control for low weld current, high weld current, initial welding pressure, impact forging pressure, cool time and hold time. Vol. 84, p. 1049.

BRAZING ALLOYS—*Eutectic Welding Alloys, Inc., 40 Worth St., New York, N. Y.* "Castolin" low-temperature welding and brazing eutectic alloys (not shown), available in a full range of special alloys in rod form, are said to make use of a new eutectic bonding technique. Vol. 84, p. 1109.

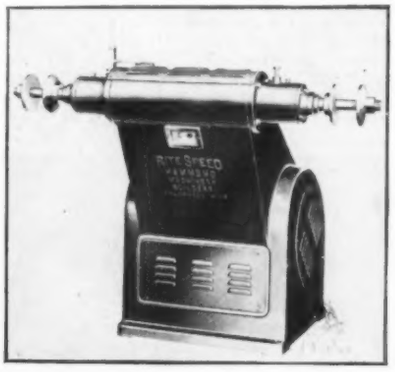
WELDING ROD—*Air Reduction Sales Co., 60 E. 42nd St., New York, N. Y.* A high-test flux-coated bronze welding rod (not shown) offers advantages of low fuming, faster application, denser deposit, increased tensile strength, greater bond strength, increased hardness, improved ductility and saving in time. Vol. 84, p. 1110.

WELDING PRESSURE METER—*Thomson-Gibb Electric Welding Co., 16½ Pleasant St., Lynn, Mass.* This resistance welding pressure meter consists of an oil-filled diaphragm connected to a gage made with a bronze-bushed movement. Dial is calibrated to read directly in pounds. Gages are available in capacities up to 350, 550, 800, 1600, 2500, 4000, 5000 and 6000 lb. Vol. 84, p. 1101.

WELDING ROD—*Ampco Metal, Inc., 3830 W. Burnham St., Milwaukee, Wis.* Versatile aluminum-bronze welding rod (not shown) is readily handled for stronger, longer-wearing welds. It provides metal having good bearing qualities, wear resistance, high fatigue strength and high impact strength. Vol. 84, p. 798.



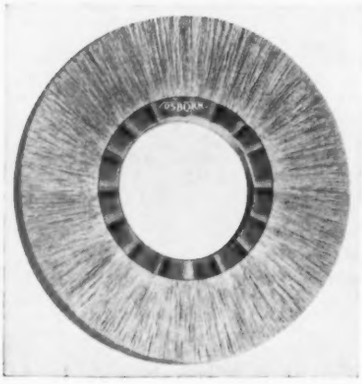
POSITIONER—*Cullen-Friestedt Co., 1300 S. Kilbourn Ave., Chicago, Ill.* Model 12 1,200-lb. welding positioner can be tilted 135 deg. from the horizontal, and the table can be revolved through a full circle regardless of tilt angle. Unit can be furnished fully powered with independent motor and controls for table tilt and table rotation. Table is self-locking in any position. Vol. 84, p. 641.



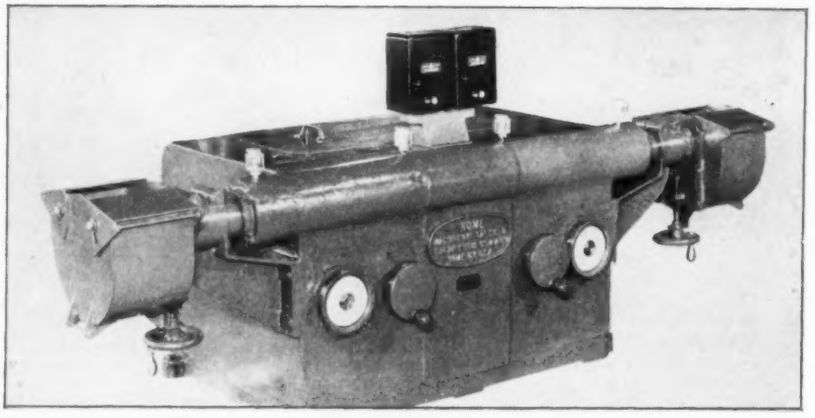
POLISHING LATHE—*Hammond Machinery Builders, 1618 Douglas Ave., Kalamazoo, Mich.* An addition to the "Rite-Speed" polishing and buffing lathes is the No. 10-ROH which features a spindle protruding 12½ in. over the lower front of the base. A 10-hp. motor with multiple V-belt drive is mounted inside the base. Vol. 84, p. 776.

POLISHING LATHE—*Hammond Machinery Builders, Inc., 1618 Douglas Ave., Kalamazoo, Mich.* "Rite-Speed" overhanging-spindle polishing lathe (not shown) has been improved by the addition of a variable-speed transmission. With this device, available on the Model VRO machine, speeds from 1,500 to 3,000 r.p.m. can be obtained. Vol. 84, p. 952.

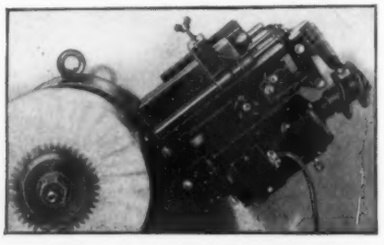
WELDING, HEAT-TREATING, CLEANING and FINISHING—Polishing Equipment



BRUSH—*Osborn Mfg. Co., 5401 Hamilton Ave., Cleveland, Ohio.* "Ring-lock" Tampico section power-driven brush locks in the fiber by a one-piece ring and sleeve, thereby reducing breakage and shedding. Vol. 84, p. 803.



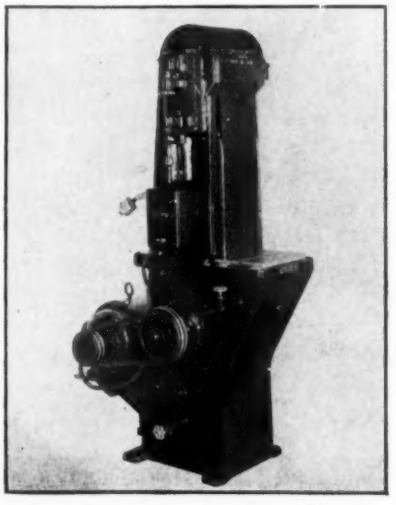
POLISHING LATHE—*Rome Machinery Sales & Engineering Co., 627-35 Webster St., Rome, N. Y.* Covering a wheel spindle speed range from 1,800 to 7,000 r.p.m., the Model 2AS polishing, buffing and grinding lathe is equipped with spindles independently driven by 3-hp. motors. Guards adjust for wheel wear. Vol. 84, p. 843.



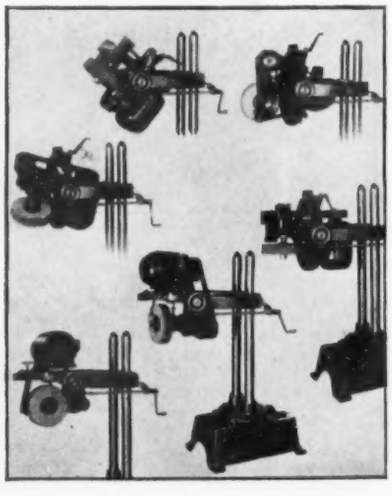
COMPOSITION APPLICATOR — *Packer Machine Co., Meriden, Conn.* A compact, self-contained applicator for automatically applying compound to buffing wheels operates independently of external cams, projecting lugs, and buffing machine speed. It holds blocks up to 8 in. wide. Unit is driven by a 1/20-hp. motorized reduction unit. Vol. 84, p. 558.

POLISHING GRAIN — *Hanson-Van Winkle-Munning Co., Matawan, N. J.* "Vanite" fused aluminum oxide polishing grain (not shown) is a product of Bauxite, from which all impurities have been removed. Grains are of the "blocky" type, as nearly equi-dimensional as possible and practically free from weak particles. Vol. 84, p. 999.

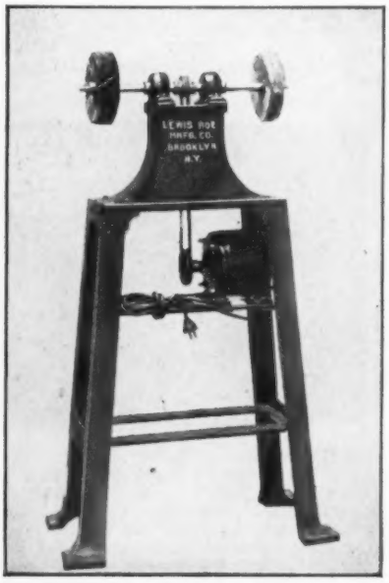
POLISHING LATHE—*Divine Bros. Co., Utica, N. Y.* Type VCS polishing and buffing lathe provides 40 in. between wheels, with a 52-in. spindle length. It is available with 3-, 5- or 7½-hp. motor. Drive is by V-belts. Vol. 84, p. 394.



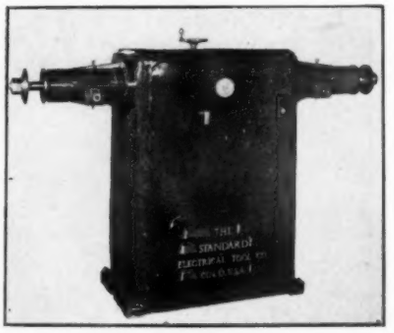
WET-DRY SANDER — *Porter-Cable Machine Co., Syracuse, N. Y.* Model G-8 wet-dry belt sander-grinder provides speeds from 2,400 to 6,000 ft. per min. for grinding metals, plastics, ceramics, glass, rubber, and similar materials. It is used for squaring, cleaning, burring, facing, polishing, and for removing gates and flash from castings. 9-ft. belt reduces heat. Vol. 84, p. 261.



BUFFING HEAD — *Murray-Way Corp., 253 Vinewood, Detroit, Mich.* Buffing heads can be quickly adjusted to any wheel position for successive and production finishing, and can be used in combination with dial type, indexing or continuous rotation dial machines, or with a continuous straight-line conveyor. Dial table has a constant index time, but time of dwell is varied over a wide range by electric controls. Vol. 84, p. 937.

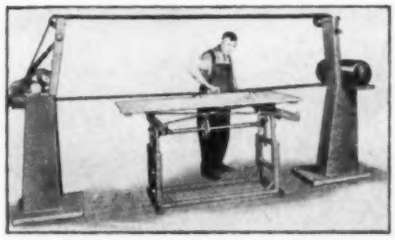


POLISHING STAND—*Lewis Roe Mfg Co., 1050 DeKalb Ave., Brooklyn, N. Y.* A small polishing machine for light buffing consists of a head and stand, and is driven by a ¼-hp. a.c. or d.c. motor. It has a ¾-in. spindle mounted in two self-aligning ball bearings. Vol. 84, p. 349.

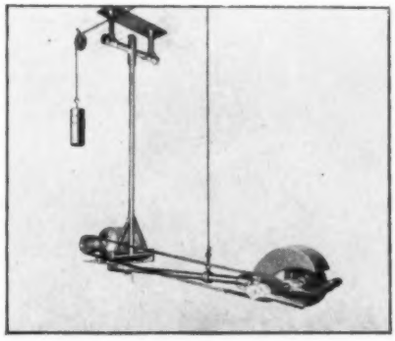


POLISHING LATHE—*Standard Electrical Tool Co., 1940 W. 8th St., Cincinnati, Ohio.* This infinitely variable speed buffing and polishing machine provides correct speed for each operation, using any size or type of wheel. Speed changes are accomplished merely by turning a handwheel. Each speed is shown on a dial. Range is 1,000 to 3,500 r.p.m. Machine is available in 3, 5 and 7½-hp. sizes. Vol. 84, p. 775.

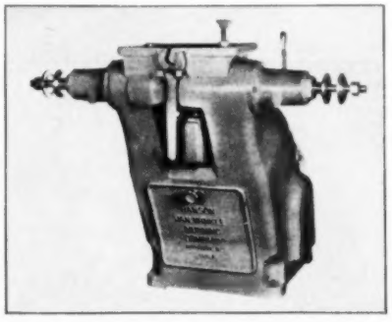
Polishing Equipment—WELDING, HEAT-TREATING, CLEANING and FINISHING



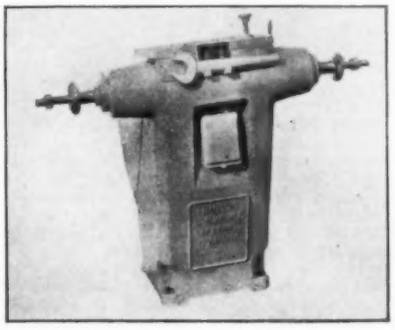
BELT SANDER—*Jefferson Machine Tool Co., Fourth, Cutter & Sweeney Sts., Cincinnati, Ohio.* Large flat surfaces, as well as concave, convex or irregular surfaces, can be polished rapidly with this endless-belt sander. Table height is adjustable from 32 to 42 in. Top is 30x72 in. Belts up to 8 in. wide can be used. Drive is direct from a 2-hp. motor; belt travels 1,800 ft. per min. Vol. 84, p. 484.



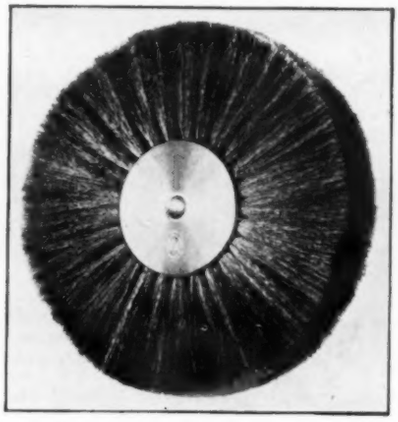
SWING GRINDER—*Jefferson Machine Tool Co., Fourth, Cutter & Sweeney Sts., Cincinnati, Ohio.* No. 101 swing frame grinding and polishing machine cleans rough castings of any kind, shape or size. Head is fully universal. Overall length is 93 in.; width is 26 in. It takes up to 14x2¾-in. grinding wheels or 14x3-in. buffing and polishing wheels. Vol. 84, p. 480.



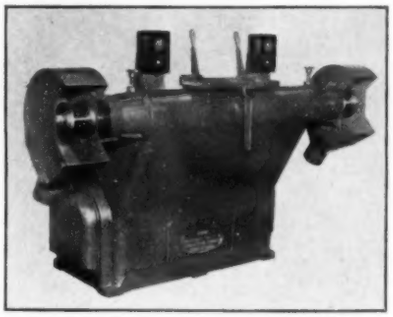
POLISHING LATHE—*Hanson-Van Winkle-Munning Co., Matawan, N. J.* Type MI buffing and polishing lathe has a 12-in. spindle overhang. Drive is through V-belts, providing speeds between 1,800 to 3,600 r.p.m. Vol. 84, p. 76.



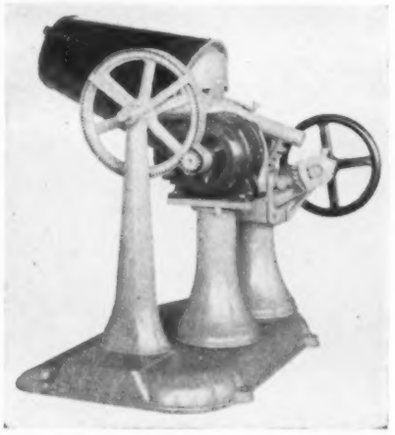
BUFFING LATHE — *Hanson-Van Winkle-Munning Co., Matawan, N. J.* Type MO buffing lathe handles work not requiring a heavy-duty machine. Drive is by V-belt. Any speed from 1,800 to 3,600 r.p.m. is possible. Vol. 84, p. 226.



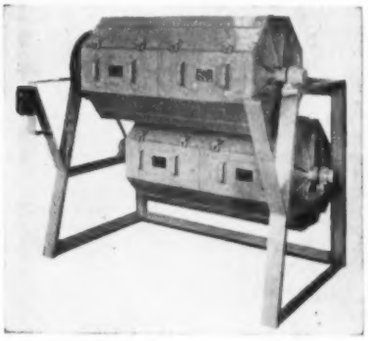
SCRATCH BRUSH — *Hanson-Van Winkle-Munning Co., Matawan, N. J.* "Metl-Hub" scratch brush has a one-piece circular metal hub of light-weight alloy. It will handle all types of wet work, as there is no danger of warping or splitting the hub. Steel, brass, and nickel-silver wire may be used, as well as bristle and hair. Vol. 84, p. 316.



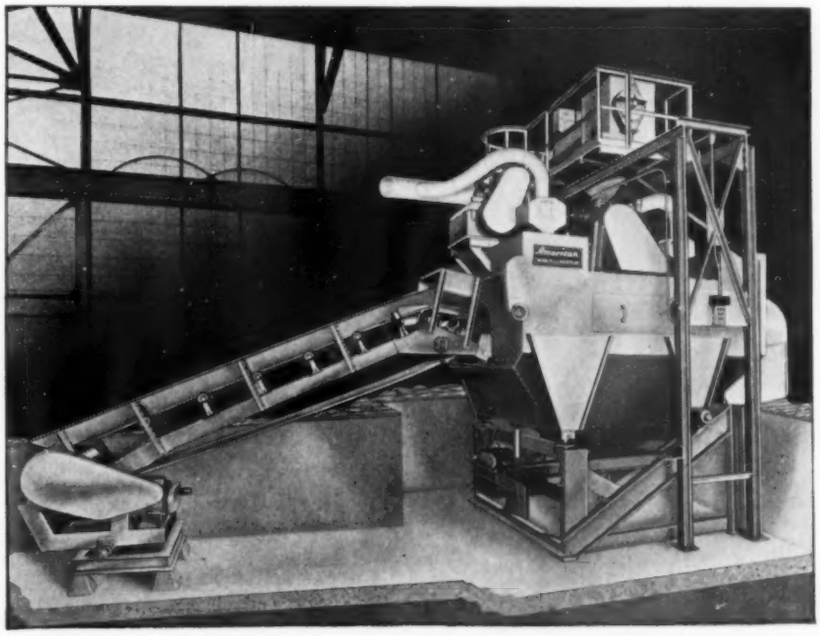
POLISHING LATHE—*Rome Machinery Sales & Engineering Co., 627-35 Webster St., Rome, N. Y.* Arranged for independent wheel operation, Model 2-MIS polishing and buffing lathe is available up to 10 hp. capacity per spindle with individual motor drive for each spindle. Standard equipment includes taper screw points, variable-speed drives, composition applicators, high-speed auxiliary spindles and abrasive belt grinding attachments. Vol. 84, p. 67.



TUMBLING BARREL—*Globe Machine & Stamping Co., 1250 W. 76th St., Cleveland, Ohio.* Motor-driven tilting tumbling barrels finish parts difficult to burnish or polish in the usual way. A special work-shifting bottom promotes tumbling action and cuts tumbling time. Barrels can be furnished with steel, cast iron, cast brass, wood, Monel or stainless steel shells. They are available in five sizes. Vol. 84, p. 802.

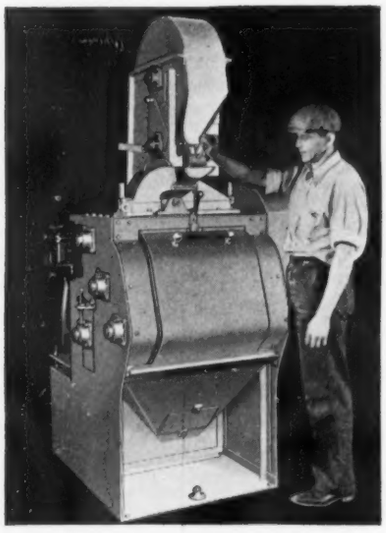


"ROTO-FINISH" BARREL—*Crown Rheostat & Supply Co., 1910 Maypole Ave., Chicago, Ill.* A double cylinder barrel has been developed especially for the Sturgis "Roto-Finishing" tumbling process for finishing die castings and stamped metal parts of stainless steel, brass, etc. Vol. 84, p. 801.



CONTINUOUS CLEANING MACHINE—*American Foundry Equipment Co., 555 Byrkit St., Mishawaka, Ind.* This continuous "Wheelabrator Tumblast" cleaning unit is made in various sizes for a wide range of work. It uses a combination of tumbling and longitudinal work travel, with a double abrasive blast. Vol. 84, p. 552.

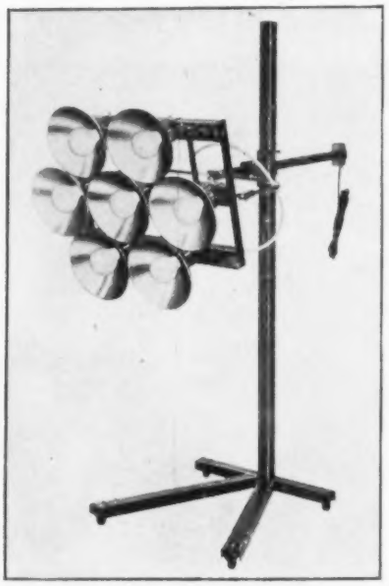
WELDING, HEAT-TREATING, CLEANING and FINISHING—Cleaning Equipment



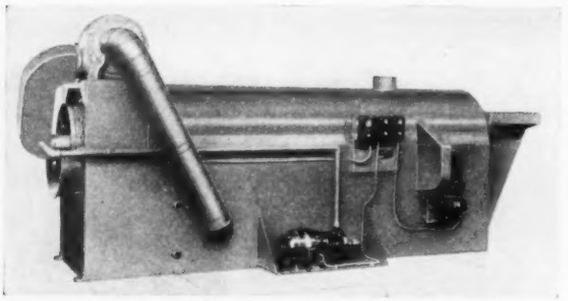
ABRASIVE CLEANER — *American Foundry Equipment Co., 555 Byrkit St., Mishawaka, Ind.* Small 15x20-in. "Wheelabrator Tum-Blast" airless abrasive blasting mill cleans and finishes small work in loads up to one cubic foot. Cleaning chamber is formed by an endless apron conveyor. "Wheelabrator" blasting unit whips a continuous stream of metallic shot or grit down on work to full width of cleaning chamber. Vol. 84, p. 70.

PICKLING AGENT—*Enthone Co., 442 Elm St., New Haven, Conn.* "Pickleen" agent (not shown) for pickling baths lowers surface tension of sulfuric or hydrochloric acid solutions. It is recommended especially for pickling parts in bulk for barrel plating, hot tinning, or galvanizing. Vol. 84, p. 116.

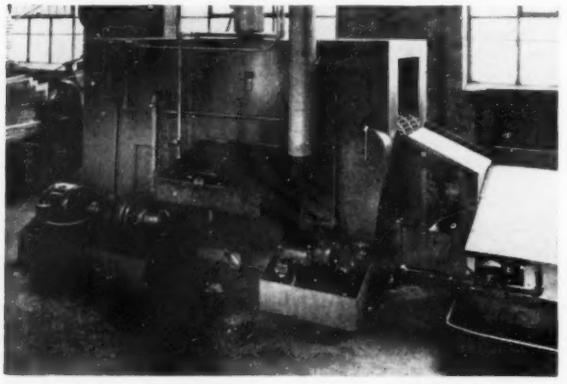
ALUMINUM CLEANER—*Cowles Detergent Co., 7016 Euclid Ave., Cleveland, Ohio.* Cowles AE mildly alkaline aluminum cleaner (not shown) has been especially developed to prevent corrosion of non-ferrous metals. Parts rinse freely and after drying are ready for further finishing. Vol. 84, p. 648.



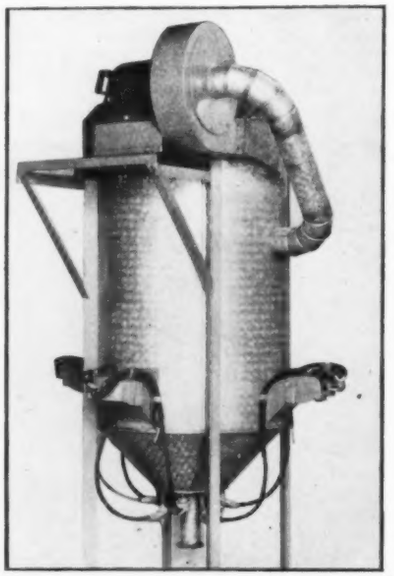
INFRA-RED LAMPS — *Fostoria Pressed Steel Corp., Fostoria, Ohio.* Model P-7-IR portable infra-red baking fixture, equipped with gold plated reflectors, is universally adjustable for many applications. It handles areas up to approximately 30 in. in diameter and can be adjusted to a height of 18 to 72 in. Vol. 84, p. 692.



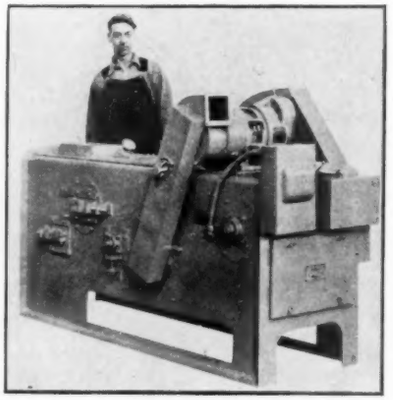
WASHER AND DRYER—*N. Ransohoff, Inc., W. 71st St. at Millcreek, Carthage, Cincinnati, Ohio.* No. 725 continuous drum type washing and drying machine cleans many types of metal parts. It consists of a soak wash, spray wash, drain and dry, the work passing continuously from one section to the next. Delicate work can be handled without injury. Vol. 84, p. 802.



WASHER AND DRYER—*N. Ransohoff, Inc., W. 71st St. at Millcreek, Carthage, Cincinnati, Ohio.* No. 64-N conveyor-type washing and drying machine cleans parts which cannot be put through drum type machines. Cleaning compound is sprayed onto the work through countersunk holes in transverse pipes located above and below the conveyor. Vol. 84, p. 803.

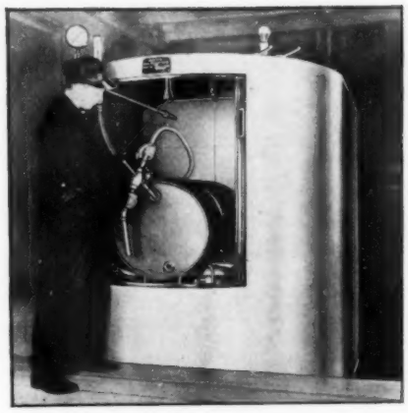


ABRASIVE CLEANER — *Lciman Bros., Christie St., Newark, N. J.* Three small parts at once can be cleaned or stencilled with this semi-automatic sandblast machine. Complete self-contained unit includes dust collecting fan and dust separator. Vol. 84, p. 992.

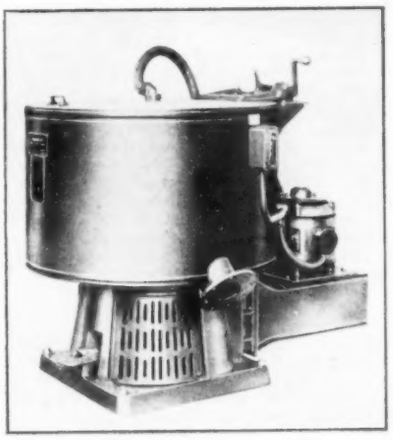


MAGNETIC SEPARATOR — *Stearns Magnetic Mfg. Co., Milwaukee, Wis.* A magnetic separator using alternating current for energizing the magnetic field has been developed especially for separating finely ground powdered metal which may be contaminated by impurities such as oxide, scale, charcoal and silica. Identified as the Type AM, this separator is claimed to be unusually effective since the material receives 120 pulsations per second. Material can be inspected while separator is in operation. Bearings are mounted on the outside for ready accessibility. An exhaust fan removes dust. Vol. 84, p. 783.

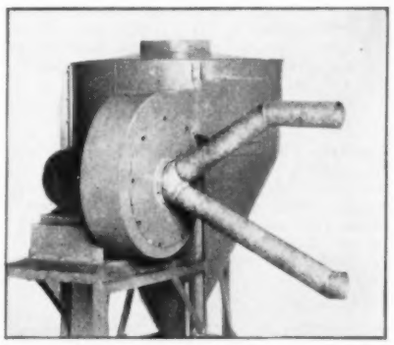
Cleaning, Plating—WELDING, HEAT-TREATING, CLEANING and FINISHING



DRUM RECONDITIONER—*Portland Co., Portland, Me.* "Portco" oil-drum reconditioner automatically cleans and dries both inside and outside of oil drums in one continuous operation. Closing the door starts an automatic cycle, successively forcing into and over the drum a caustic solution, rinse water and air for drying. Vol. 84, p. 184.



WASHER—*Tolhurst Centrifugal Div., American Machine & Metals, Inc., East Moline, Ill.* "Centriforce" unit washes, rinses and dries small metal parts in one machine. Up to 25 batches an hour are handled. Vol. 84, p. 644.



DUST COLLECTOR—*Leiman Bros., Inc., 101-EE-2 Christie St., Newark, N. J.* Double suction is a feature of this self-contained dust collector, built for drawing dust away from the top as well as the bottom of a buffing or grinding wheel. It is available for one or two wheels up to 24 in. in diameter. Vol. 84, p. 1038.

CLEANING PROCESS—*Oakite Products, Inc., 22 Thames St., New York, N. Y.* "Oxbrite" method of electro-cleaning brass, bronze and other copper alloys before electro-plating (not shown) effectively removes foreign matter from work so that bright, uniform deposits result. Vol. 84, p. 851.

RUST-RESISTANT COATING—*Scully Steel Products Co., 1319 Wabansia Ave., Chicago, Ill.* Type XP-320 graphite coating (not shown) for rust prevention is spread on thinly and dries in from twenty to thirty minutes. It does not allow dust or dirt to adhere to the surface. Vol. 84, p. 952.

CLEANING COMPOSITIONS—*Oakite Products, Inc., 22 Thames St., New York, N. Y.* Composition No. 54 B (not shown) is intended specifically for electro-cleaning polished steel and buffed copper before plating. Composition No. 27 (not shown) is a versatile, heavy-duty cleaning material which can be used either as a still tank cleaner or as an electro-cleaner. Vol. 84, p. 801.

RUST PREVENTIVES—*E. F. Houghton & Co., 240 W. Somerset St., Philadelphia, Pa.* A series of rust preventives (not shown), including liquid rust-inhibiting non-drying products built from a newly developed base includes grease-type (non-drying) products; drying, hard-film products, semi-drying (waxy film) and soluble rust preventives. Vol. 84, p. 1046.

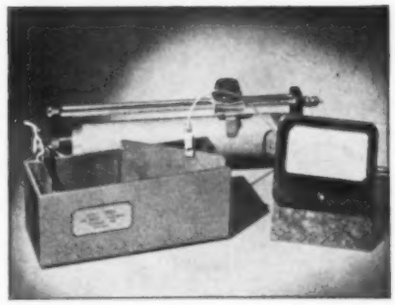
CLEANING COMPOUND — *Cowles Detergent Co., 10525 Carnegie Ave., Cleveland, Ohio.* MC metal cleaner (not shown) is for cathodic cleaning of steel, brass and copper. It is readily soluble, cleans fast and rinses rapidly. Vol. 84, p. 1049.

"JETALIZING" PROCESS—*Hanson-Van Winkle-Munning Co., Matawan, N. J.* "Jetal" process (not shown) for applying a black corrosion-resistant finish to steel has been changed to a two-bath system which yields a deeper black coating and at the same time permits simpler manipulation and solution control. All steels, except those high in nickel or chromium, can be colored. Vol. 84, p. 600.

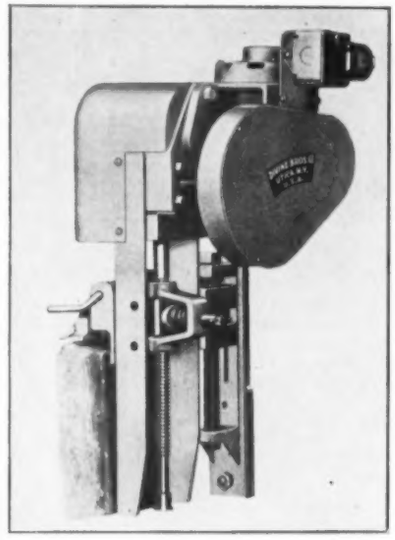
BARREL PLATER—*Hanson-Van Winkle-Munning Co., Matawan, N. J.* In this improved hopper-type barrel plating machine a variety of small parts, difficult to clean by the ordinary dipping basket method, are run through a cleaning cycle, from hopper to hopper, and finally plated in the same series. Each hopper requires approximately 55 sec. to make a cycle. Vol. 84, p. 347.

PLASTIC PLATING PROCESS—*Acheson Colloids Corp., Port Huron, Mich.* Wood, phenolic products, ebonite and other non-conducting materials can be electroplated after using a surface treatment (not shown) which consists of applying a coating containing a hardenable organic colloid, a hardening agent and colloidal graphite, suspended in water. Coating hardens on exposure to light and renders the surface conductive. Vol. 84, p. 446.

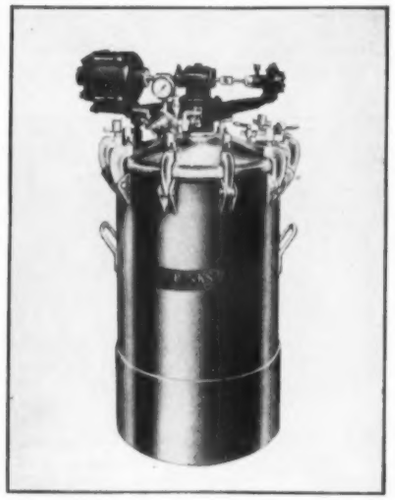
POTASSIUM CYANIDE—*R. & H. Chemicals Dept., E. I. du Pont de Nemours & Co., Wilmington, Del.* Manufacture in the United States of potassium cyanide, employed in hardening tool steels and in electroplating, has been begun. Vol. 84, p. 1108.



SOLUTION TESTER—*Kocour Co., 4724 S. Christiana Ave., Chicago, Ill.* "Hull Cell" determines current characteristics of electroplating solutions. Current density which produces the best plate is revealed. Vol. 84, p. 224.

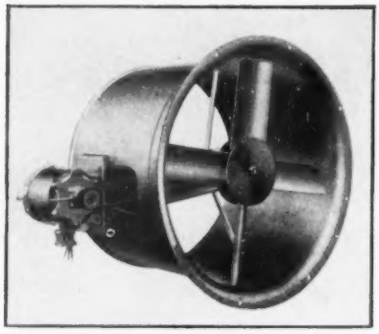


COMPOSITION APPLICATOR—*Divine Bros. Co., Utica, N. Y.* Model AK-4 device automatically applies compounds to buffing wheels. It is suitable for all types of automatic and semi-automatic buffing machines. Vol. 84, p. 1044.

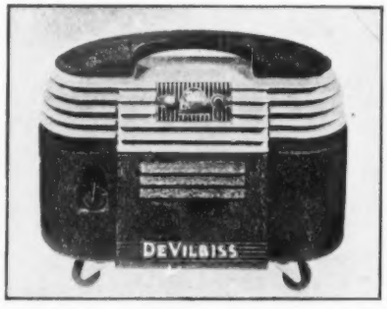


CIRCULATING PUMP—*Binks Mfg. Co., 3114–36 Carroll Ave., Chicago, Ill.* No. 460 combination agitator and circulating pump for spray finishing work is adaptable to all Binks Type TU tanks. It is suitable for multiple spray gun operation and for short pipe runs. Vol. 84, p. 896.

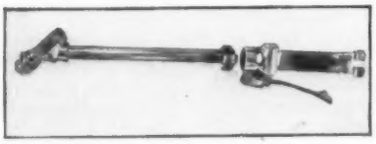
WELDING, HEAT-TREATING, CLEANING and FINISHING—Painting Equipment



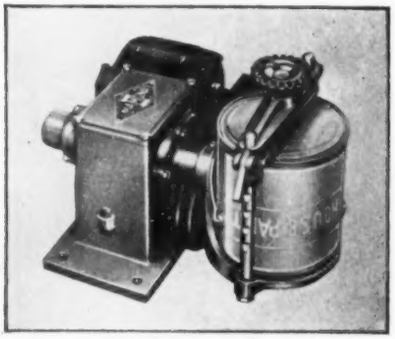
SPRAY BOOTH FAN—*DeBothezat Ventilating Equipment Div., American Machine & Metals, Inc., East Moline, Ill.* This paint spray booth fan is corrosion-resisting and non-sparking. It is driven by V-belts through a vapor-proof chamber. Vol. 84, p. 1102.



PORTABLE COMPRESSOR—*DeVilbiss Co., Toledo, Ohio.* Type NKB portable air compressor for operating small paint spraying equipment is rated at ½ hp. and weighs only 72 lb. Actual delivery is 4.55 cu.ft. per min. at 45 lb. pressure. Vol. 84, p. 897.



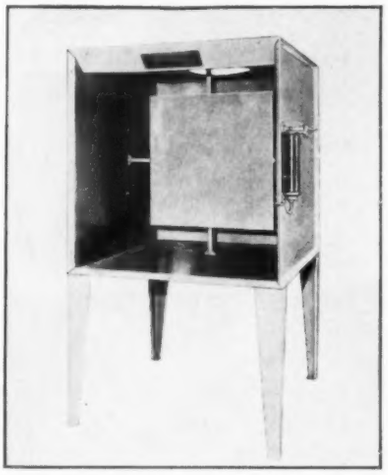
EXTENSION SPRAY GUN—*Eclipse Air Brush Co., 390 Park Ave., Newark, N. J.* Type EX extension spray gun is supplied in lengths up to 12 ft. It has a detachable gun grip control, and different lengths of shaft can be used in the same grip. Vol. 84, p. 559.



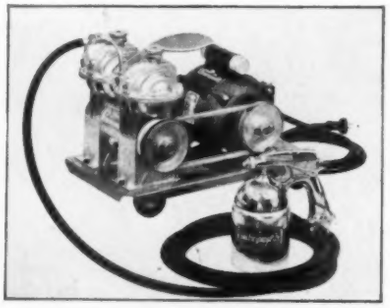
PAINT CONDITIONER — *Diamond Iron Works, Inc., Minneapolis, Minn.* This paint conditioner is made in 1- and 5-gal. sizes. It operates on a reverse action principle, quickly conditioning even old stock. Vol. 84, p. 480.

PAINT SPRAYERS—*DeVilbiss Co., Toledo, Ohio.* Small spray-painting outfits include five assemblies built around an improved ¼-hp. motor-driven compressor. Three are cup gun outfits and two include a pressure feed paint tank. Rated displacement is 4.3 cu.ft. per min. at 40 lb. pressure. Actual air delivery is 2.6 cu.ft. per min. at a maximum pressure of 50 lb. Vol. 84, p. 462.

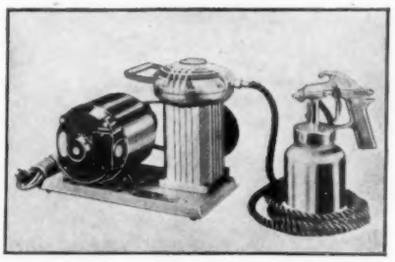
AGITATORS—*Binks Mfg. Co., 3114–26 Carroll Ave., Chicago, Ill.* Propeller-type air-motor agitators (not shown) for both open and closed type containers are suitable for use with liquids having an explosion hazard. Shafts can be from 12 to 27 in. long. Vol. 84, p. 270.



SPRAY BOOTH—*Binks Mfg. Co., 3114–26 Carroll Ave., Chicago, Ill.* Made in one size only, 3½ ft. wide, high and deep, this small spray booth has interchangeable panels so that exhaust can be run out of top, side or back. Vol. 84, p. 272.



PAINT SPRAYER—*Electric Sprayit Co., Sheboygan, Wis.* This portable paint spraying unit is designed for general maintenance painting and small-lot production work. Compressor is V-belt driven by either a ½-hp. electric motor or a ⅝-hp. gasoline engine. Displacement is over 5 cu.ft. per min., with a spraying pressure of over 40 lb. Vol. 84, p. 150.



PAINTING OUTFIT—*Binks Mfg. Co., 3114–26 Carroll Ave., Chicago, Ill.* "DS" spray painting outfit incorporates a single-diaphragm compressor driven by a ¼-hp. motor and a Roche "J" gun of internal atomization bleeder type. Compressor delivers 2.2 cu.ft. per min. at 26 lb. per sq.in. pressure. Vol. 84, p. 152.

"HI-SPOT" BLUE—*Dykem Co., 2301 N. 11th St., St. Louis, Mo.* "Hi-Spot" Blue No. 107 (not shown) is a soft, uniform paste, intensely blue, that spreads easily and evenly and transfers clearly from master surface gage to show up high spots on bearing surfaces. Vol. 84, p. 354.

WATERPROOFING — *Flexrock Co., Dept. A. M., 2300 Manning St., Philadelphia, Pa.* "Flexseal" (not shown) is made of nitrocellulose, lacquer, oils and solvent, and is claimed to be especially efficient in waterproofing coarse building materials. It has a penetrating nature, yet has enough body to clog up any pores, open spaces or voids in mortar, concrete, brick and stone. Vol. 84, p. 486.

NON-SLIP PAINT—*Truscon Laboratories, Inc., Box 69, Milwaukee Junction P.O., Detroit, Mich.* "Safe-T-Step" rubber-base paint (not shown) combined with an abrasive is said to take "skid" out of floors of all kinds. It is claimed to bond perfectly with old paint, if in sound condition. Vol. 84, p. 404.

FLOOR DYE—*Tamms Silica Co., 228 N. La Salle St., Chicago, Ill.* A floor dye (not shown) suitable for coloring cement or concrete floors can be used for waterproofing such surfaces. This dye, available in six shades, has penetrating qualities that fill all open pores. Vol. 84, p. 486.

WOOD FLOOR FINISH—*Flexrock Co., Dept. A.M., 2300 Manning St., Philadelphia, Pa.* Suitable for use on nearly every type of floor, "Bakeflex" finish (not shown) is practically transparent. Its Bakelite base gives it acid, fire and dirt resistance. Vol. 84, p. 449.

FLOOR FINISH—*Flexrock Co., Dept. A.M., 2300 Manning St., Philadelphia, Pa.* "Glasflex" transparent floor covering (not shown) has been improved so that it is claimed to be totally resistant to acid and alkali. Vol. 84, p. 51.

FLOOR DYE—*Flexrock Co., Dept. A. M., 2300 Manning St., Philadelphia, Pa.* "Colorflex" enamel-like floor dye (not shown) has been improved to make it resistant to fire, acids and alkali. Vol. 84, p. 999.

Finishes—WELDING, HEAT-TREATING, CLEANING and FINISHING

FLOOR WAX—*Flexrock Co., Dept. A. M., 2300 Manning St., Philadelphia, Pa.* Non-slip floor wax (not shown) embodying Neoprene provides longer life and greater resistance to abrasion and heat. Vol. 84, p. 999.

PROTECTIVE COATING—*Michigan Chrome Co., 6340 E. Jefferson Ave., Detroit, Mich.* "Micerolac" coating (not shown) protects and beautifies metal surfaces, either natural or plated. This medium offers excellent qualities of adhesion, flexibility and abrasion resistance. It also provides resistance to sulphur dioxide, sunlight, moisture, oil, grease, and gasoline. Vol. 84, p. 601.

FLOOR COVERING—*Flexrock Co., Dept. A.M., 2300 Manning St., Philadelphia, Pa.* "Colorflex" pigmented resin (not shown) improves and preserves both wood and concrete floors. It has a hard, enamel-like finish. Vol. 84, p. 153.

FLOOR COATING—*Truscon Laboratories, Box 69, Milwaukee Junction P.O., Detroit, Mich.* Disadvantages of linseed oil base floor coverings are claimed to be eliminated in "Paratex" coating (not shown) for concrete and wood floors. It will dry hard enough to walk on in a few hours. It will be oil and grease-proof in 24 hours, and resistant to most chemicals in 48 hours. Vol. 84, p. 51.

PAINT STICK—*Markal Co., 8 E. Lake St., Chicago, Ill.* "Markal A" solidified paint in stick form (not shown) which can be used for marking either hot or cold surfaces, is especially adapted for marking cold metal parts which require subsequent heat-treatment up to 1600 F. The part can be immersed in oil or water immediately after heating without impairing legibility of marks. Vol. 84, p. 902.

TANK ENAMEL—*Porcelain Enamel & Mfg. Co., Eastern & Pemco Aves., Baltimore, Md.* "Saty-Nite" porcelain finish (not shown) was especially developed for hot water tanks. Vol. 84, p. 851.

GRAIN FINISH—*Maas & Waldstein Co., 438 Riverside Ave., Newark, N. J.* A finishing schedule (not shown) that reduces time required for grain work uses a special speed primer as the base coat. This coat will dry out of dust in five minutes and is ready to receive graining ink within an hour. Vol. 84, p. 902.

MARKING COMPOUND — *Scully Steel Products Co., 1319 Wabansia Ave., Chicago, Ill.* "Paintstick" (not shown) for hot-marking metal slabs, has been made available in different grades. One is for temperatures between 150 and 850 F., and another for temperatures between 350 and 1,400 F. Both grades are supplied in two types. Type S-2 is not weatherproof, while type W-2 is weatherproof. Vol. 84, p. 806.

INFRA-RED ENAMELS — *Maas & Waldstein Co., 438 Riverside Ave., Newark, N. J.* Two lines of enamels (not shown) especially developed for high-speed baking in infra-red lamp (radiant heat) ovens, take full advantage of short warming-up periods and rapid baking. These "Raydur" synthetic baking enamels and "Duart" wrinkle enamels will bake to a hard, durable surface in 15 to 20 min. Vol. 84, p. 354.

INFRA-RED FINISHES—*Ault & Wiborg Corp., Dana & Thomas Aves., Cincinnati, Ohio.* A line of finishes (not shown) developed especially for use with infra-red baking equipment includes both under coats and top coats in a full range of plain colors with no limitation as to lustre. A hammered effect and various wrinkle finishes are also available. Vol. 84, p. 740.

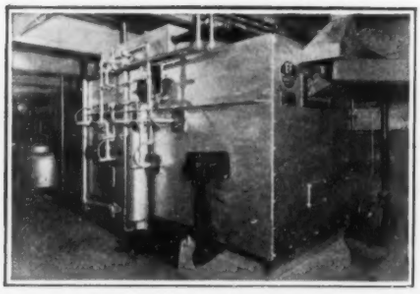
METAL COATING — *Watson-Standard Co., 225 Galveston Ave., Pittsburgh, Pa.* "Protexteel" (not shown) is claimed to dry hard in any weather, resist abrasion and abuse, and to defy corrosion. Vol. 84, p. 1101.

HAMMERED METAL FINISH—*Maas & Waldstein Co., 438 Riverside Ave., Newark, N. J.* Finishes resembling hammered silver, copper, bronze, and other ornamental metals can be applied to products made of any kind of metal and plastics by "Hammertone" (not shown). A base coat of the desired color is first sprayed on. This is followed immediately by a spatter coat, which produces the pattern in the base coat. The product is then baked at medium heat for an hour, which produces a lustrous metallic finish that is tough and durable. Vol. 84, p. 791.

LAYOUT DOPE—*Tamms Silica Co., 228 N. LaSalle St., Chicago, Ill.* Blue layout dope (not shown) has been developed especially for tool and die makers. It is quick drying and will not rub off. Scribe shows a clear, sharp line without chipping or scraping. Vol. 84, p. 601.

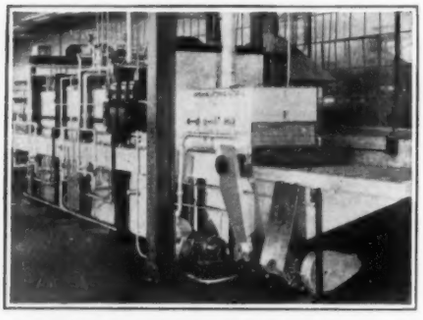
WRINKLE FINISH—*New Wrinkle, Inc., Dayton, Ohio.* "Wrintex" resin (not shown) is claimed to produce a wrinkled texture under all conditions. The solution contains 60 per cent resin by weight in 40 per cent Xylol. High solid content permits a wide range of solvents for after-thinning. When reduced for free spraying, it will bake hard in one hour at 200 F. Vol. 84, p. 558.

STOVE ENAMELS—*Maas & Waldstein Co., 438 Riverside Ave., Newark, N. J.* "Codur" stove enamels (not shown) can be supplied in white, porcelain white and colors. A single coat baked from 5 to 45 min. produces a glossy finish which is said to be resistant to marring, hot grease and kerosene and which will withstand heating to 420 F. for eight hours. Vol. 84, p. 851.

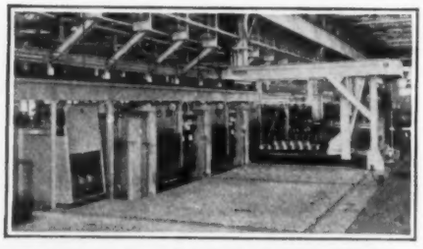


MACHINE GUN CARTRIDGE CLIPS are heat treated uniformly, continuously and scale-free in this E.F. special atmosphere continuous chain belt conveyor type furnace—one of a number of continuous furnaces built by The Electric Furnace Co., Salem, Ohio adapted to heat treating arms and ammunition components.

AIRCRAFT ENGINE PARTS are nitrided in this battery of double ended reciprocating type furnaces—part of the worlds largest nitriding furnace installation. These furnaces were designed and built by The Electric Furnace Co., Salem, Ohio and installed in a prominent U. S. aircraft engine plant.

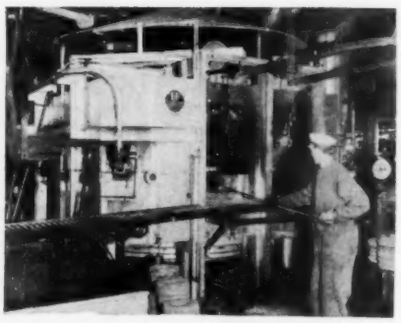


ANNEALING SHELLS Designed for annealing brass shells, this E. F. gas fired continuous roller hearth furnace is also adapted to treating steel shells. Large shells are carried direct on rollers—smaller shells are loaded into pans on trays. Built in various sizes by The Electric Furnace Co., Salem, Ohio.



BRASS FOR CARTRIDGES and other products are uniformly treated in various types of EF continuous, semi-continuous and batch type furnaces. The above installation shows 3 gas fired, hearth type forced circulation furnaces with quench, cooling chamber and handling crane—one of several similar installations made in prominent nonferrous plants by The Electric Furnace Co., Salem, Ohio.

AIRPLANE PROPELLOR BLADES and other aircraft parts are securely joined in this E.F. copper brazing furnace—one of a number of types of continuous and batch type installations made by The Electric Furnace Co., Salem, Ohio for copper and brass brazing and silver soldering, large and small assemblies.



FORGING FURNACES. The above oil-fired rotary is one of several continuous and semi-continuous rotary, pusher and other types of furnaces built by The Electric Furnace Co., Salem, Ohio for process heating, heat treating forgings and heating for forging. Send for printed matter.

Electric and Fuel Fired Furnaces

ELECTRIC FURNACES FUEL FIRED

We Build The Furnace To Fit The Job

FURNACES

For Forging, Annealing, Hardening, Brazing, Nitriding, Normalizing, Billet Heating

or Any Other

Heating or Heat Treating Process

•

Production Furnaces For National Defense Work

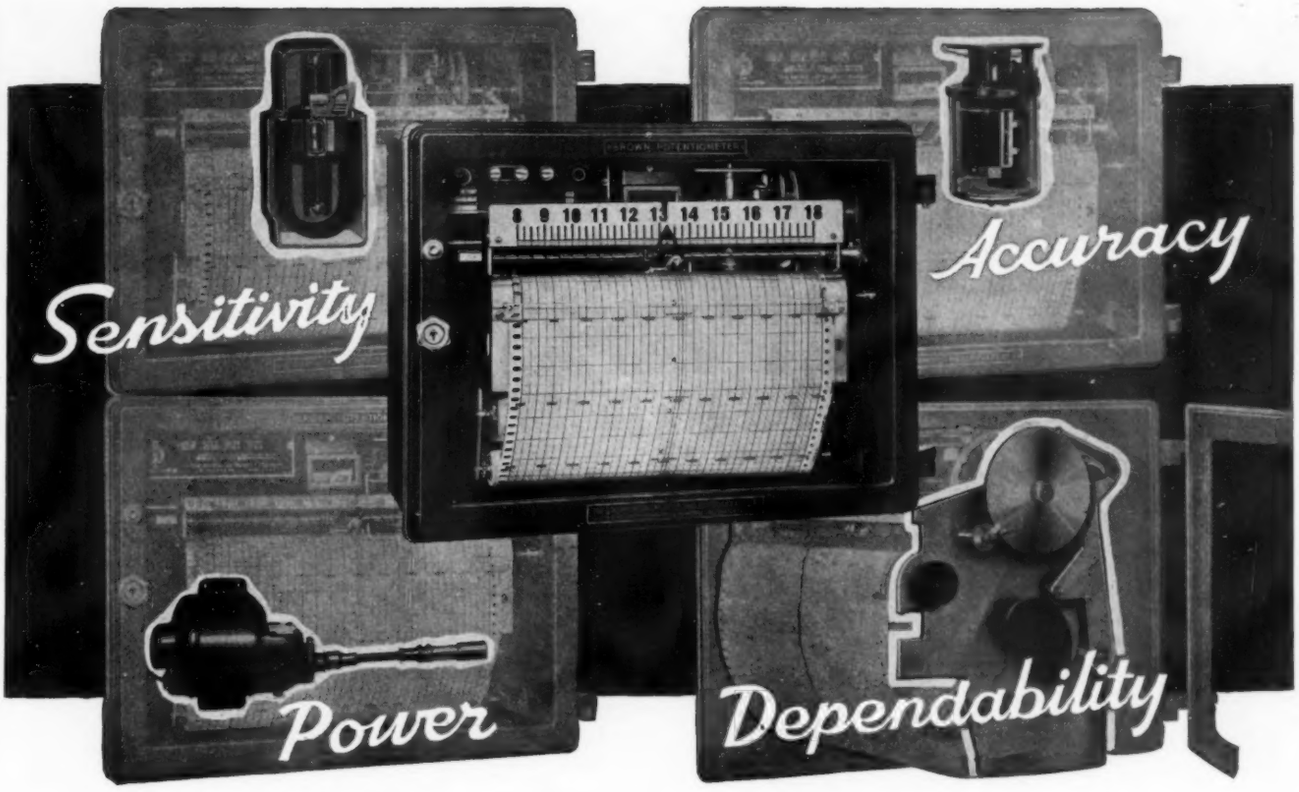
•

Our large and experienced engineering staff and ample manufacturing facilities enable us to make reasonably prompt deliveries.

We Solicit Your Inquiries.

The Electric Furnace Co., Salem, Ohio

Gas Fired, Oil Fired and Electric Furnaces—For Any Process, Product or Production



UNIT CONSTRUCTION *Permits*

QUICK DELIVERY

Brown Potentiometer Pyrometers are rugged, precision-built instruments and guaranteed to give the performance required for industrial service today or tomorrow.

Like a fine automobile, the working parts of these instruments are assembled into major units.

Because of our expanded facilities and modern manufacturing methods, an ample supply of Brown Potentiometer Pyrometer Units is now in stock ready to be calibrated and assembled to meet your specific requirements.

The mighty industrial defense program is geared to run at a tremendous pace. SPEED UP! SPEED UP! is today's demand in the Metal Working Industry.

It is our desire to assist you in every way possible to speed up production. Write, phone or wire our nearest branch. Tell us your need . . . We'll follow through if you need charts, ink, marking ribbons, thermocouples, protecting tubes, and extension lead wire . . . in fact, every standard item you need can be shipped immediately.

Leading metallurgists who demand prompt delivery, extreme precision and reliable measurement and temperature control of all types of electric, gas, or oil-heated units specify Brown Potentiometer Pyrometers to improve quality, reduce costs.

THE BROWN INSTRUMENT COMPANY, a division of Minneapolis-Honeywell Regulator Co., 4501 Wayne Avenue, Philadelphia, Pa. Offices in all principal cities. Toronto, Canada: 117 Peter Street—Amsterdam-C, Holland; Wijdesteeg 4—England: Wadsworth Road, Perivale, Middlesex—Stockholm, Sweden: Nybrokajen 7.

RAPID REPAIR SERVICE

If an accident damages a Brown Potentiometer Pyrometer, it can be returned to service promptly. A Brown factory-trained service engineer will bring new parts and make repairs in your plant.

Get the facts about Brown Periodic Service. Discover how little it costs you to have your instrument investment protected by a nationwide organization of factory-trained service engineers who already supply Brown Periodic Service to more than 2,000 industrial plants.

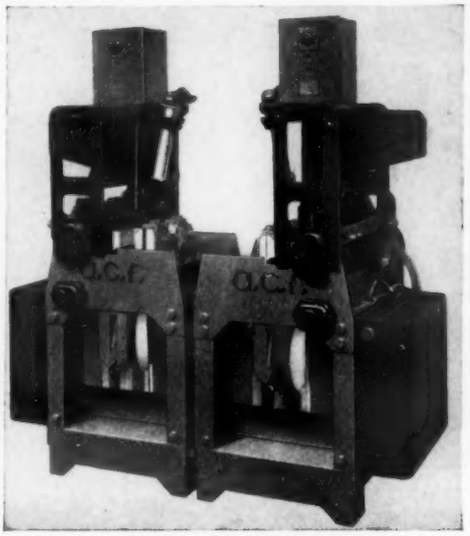
BROWN POTENTIOMETER PYROMETERS
AND
MINNEAPOLIS · HONEYWELL CONTROL SYSTEMS

To Measure and Control is to Economize

FOR BETTER WORK AT LOWER COST—
a.c.f. BERWICK ELECTRIC METAL HEATERS

BETTER WORK. Electric heating develops less scale; hence, less injury to dies, better finish with less grinding and polishing. Heats uniformly across the diameter; hence, no hard cores to split dies. Metal flow is evenly spaced in upsets. Electric Eye can hold exact, uniform heats—no overheating or underheating.

AT LOWER COST. No waiting time; throw the switch, the work starts heating. Reaches full heat in a matter of seconds. Every BTU in a KWH goes into the work. Pull the switch; expense stops. Eliminates intense heat, noise, smoke, odor. No early morning overtime lighting the furnace. Far better working conditions.



Fully Automatic Heaters "LA No. 3" and "LA No. 4" heat any diameter from ¼" to 1¼", any length from 4" to 24". Shortest possible heat on the end of a piece is 1⅜". Any length of heat can be made at any point on the stock. Pieces of from 4" to 24" in length and from ¼" to 1¼" in diameter can be fed through the hoppers in round, square, and hexagonal cross-section. Type "L" Heaters are manually fed, but mechanically operated. Electric Eye controls opening of electrodes. Twelve heat-speeds give proper range of heats. Use only alternating current—220, 440 or 550-volt, 25 or 60-cycle, single-phase. Other types available—to heat anything from a rivet to a six-foot bar. Write for descriptive literature.

AMERICAN CAR AND FOUNDRY COMPANY
30 CHURCH STREET, NEW YORK, N. Y. • • • CHICAGO • DETROIT • ST. LOUIS

NEED OUTSIDE HELP?

Is your plant filled with orders? . . . Is the demand for your product increasing beyond your present capacity? . . . Do you need outside help? . . . Then turn to *American Machinist's* DIRECTORY OF CONTRACT WORK FACILITIES, starting on page 367. *Each* issue now carries a regular Contract Work Section. In *this* feature issue, the Contract Work Section is expanded to include special listings and advertisements of leading companies doing work on a contract basis. Use this DIRECTORY for year-round reference. Use *American Machinist's* current issues for latest information on contract-work facilities.

On fine work like this, welders really strut their stuff when they use the recommended PAGE-ALLEGHENY STAINLESS STEEL ELECTRODE.

They get smooth beads and low spatter loss. The weld metal in the welds equals the Stainless they are welding. And the time card looks good—for vertical, overhead or horizontal welds.

Tell your local Page Distributor the type of Stainless Steel you want to weld. You can depend on his recommendation.

Ask for a copy of this Booklet ➡ ➡ ➡

PAGE HI-TENSILE "F"

A mild steel general purpose electrode of the shield-arc type especially recommended for high-speed single pass welding —horizontal, vertical or overhead. Well suited for welding Cro-Man-Sil, Cor-Ten, H. T. 50 and other alloy steels, giving welds with characteristics that better solid rolled mild steel bars.

PAGE HI-TENSILE "G"

A shield-arc electrode for high speed flat fillet and for general horizontal welding. Otherwise, its characteristics parallel those of HI-TENSILE "F".

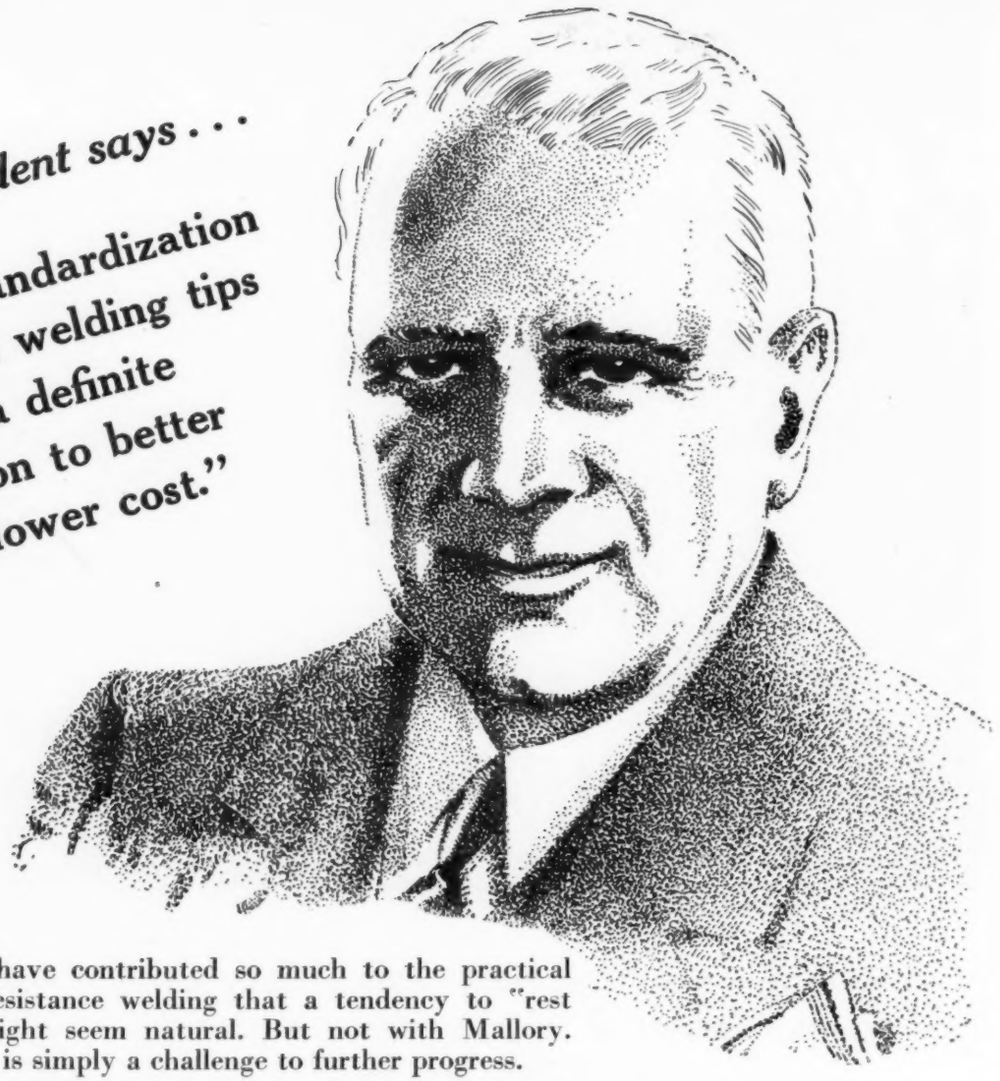
PAGE STEEL AND WIRE DIVISION • MONESSEN, PENNSYLVANIA

AMERICAN CHAIN & CABLE COMPANY, Inc.

ESSENTIAL PRODUCTS . . . AMERICAN CABLE Wire Rope, TRU-STOP Emergency Brakes, TRU-LAY Control Cables, AMERICAN Chain, WEED Tire Chains, ACCO Malleable Iron Castings, CAMPBELL Cutting Machines, FORD Hoists and Trolleys, HAZARD Wire Rope, Yacht Rigging, Aircraft Control Cables, MANLEY Auto Service Equipment, OWEN Springs, PAGE Fence, Shaped Wire, Welding Wire, READING-PRATT & CADY Valves, READING Electric Steel Castings, WRIGHT Hoists, Cranes, Presses . . . *In Business for Your Safety*

The President says . . .

"Mallory's standardization program on welding tips has made a definite contribution to better welds at lower cost."



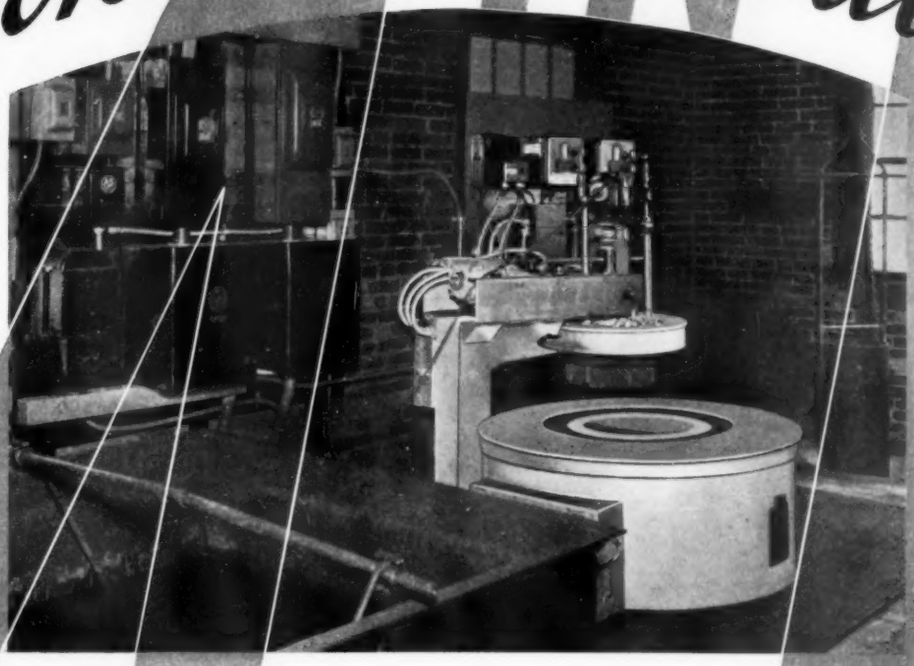
Mallory Alloys have contributed so much to the practical application of resistance welding that a tendency to "rest on the oars" might seem natural. But not with Mallory. Accomplishment is simply a challenge to further progress.

Mallory's research and development in the field of standardization of welding electrodes is typical. Years of work and collaboration with leading machine manufacturers has resulted —at a lower cost—in standardized, replaceable welding electrodes for every purpose and every machine. They completely eliminate lost time in waiting for special orders to be completed.

If you are not using Mallory Standardized Welding Electrodes, be sure to get all the facts now. You can be sure of obtaining the right electrode for your particular job . . . and for the machines you use.

P. R. MALLORY & CO., Inc.
INDIANAPOLIS INDIANA
Cable Address—PELMALLO

4 IN 1 Furnace Flexibility



Present day emergency requirements demand flexibility of equipment. To meet these emergency requirements in heat treating, the Hevi Duty Electric Gas Carburizer offers a "four in one" utility furnace for —

1. **CARBURIZING** —with natural gas —some artificial gases or oil media
2. **NITRIDING**
3. **BRIGHT ANNEALING**
4. **CLEAN HARDENING**

This "four in one" heat treating furnace embraces the major heat treating operations and has its place in the large or small plant as its economy warrants its use even though its operation may not be continuous.

HEVI DUTY ELECTRIC COMPANY

HEAT TREATING FURNACES HEVI DUTY ELECTRIC EXCLUSIVELY

MILWAUKEE, WISCONSIN

NOW ... MORE THAN EVER TIME COUNTS

So . . . for full speed ahead on U. S. Defense Orders, enlist the help of trained Oakite Service Men to smooth out all "traffic jams" from your CLEANING OPERATIONS!

SINCE cleaning is a production operation of prime importance on practically every Defense Order placed by the Government, it must be performed with safety, speed, thoroughness and economy. That is why thousands of plants today specify

SAFE, FAST-WORKING OAKITE MATERIALS ... METHODS ... SERVICE

to assure a smoothly functioning production schedule . . . to make certain of safety to personnel and product . . . to keep unit costs low.

Let us help you . . . NOW . . . when time is so important. Remember, our Nation-Wide Staff of trained representatives is at your service, without cost or obligation . . . and their recommendations are backed by a binding GUARANTEE that protects your interests in every way! Won't you write us today?

ASK US ABOUT

Safely cleaning aluminum, magnesium, other sensitive metals and alloys

Cleaning aluminum before anodizing

Removing heat scale from brass cartridge cases

Washing shells, fuzes and components

Cleaning small arms and gun parts

Tumbling small caliber cartridge cases

Washing shells before re-loading

Oakite Cutting Compound for machining large shells

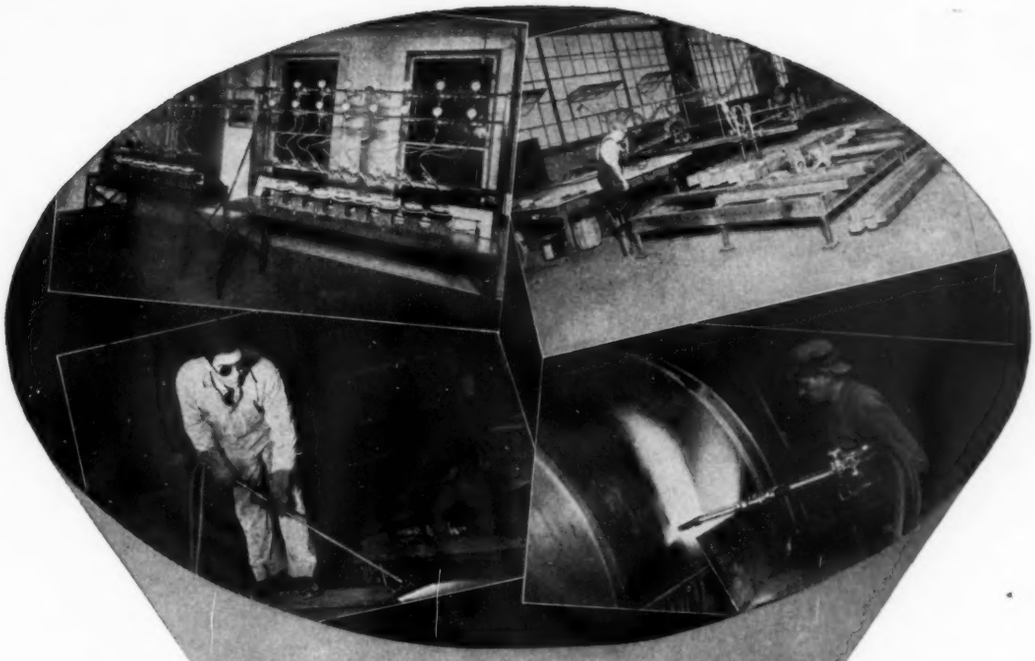
Cleaning aluminum before spot-welding

Manufactured only by

OAKITE PRODUCTS, INC., 24 Thames Street, NEW YORK, N. Y.

Representatives in All Principal Cities of the U. S. and Canada

OAKITE MATERIALS...METHODS...SERVICE — Certified — **CLEANING** FOR EVERY CLEANING REQUIREMENT



To meet today's urgent production needs

PROFIT BY PROVED

AIRCO

PROCESSES AND PRODUCTS

Mechanical Production Welding
Arc Welding
Flame Hardening
Hard-Facing
Flame Cleaning & Dehydrating
Flame Descaling
Flame Machine Grooving
Machine Gas Cutting

Oxygen — Acetylene — Nitrogen — Argon — Neon, and other Atmospheric Gases
Gas Pressure Regulators
Gas Welding & Cutting Apparatus & Supplies
Gas Welding Rods
Gas Cutting Machines
Automatic Gas Welding Machines

Portable Pipe Cutting &°Beveling Machines
Portable Weld Testing Machine
Wilson Arc Welders
Arc Welding Electrodes
Arc Welding Supplies
National Carbide
National Carbide Lights

The extra value available to every Airco customer is the cooperation of a highly trained and experienced field engineering department which will gladly help you to get the most out of Airco Products.

Air Reduction

General Offices: **60 EAST 42nd ST., NEW YORK, N. Y.**

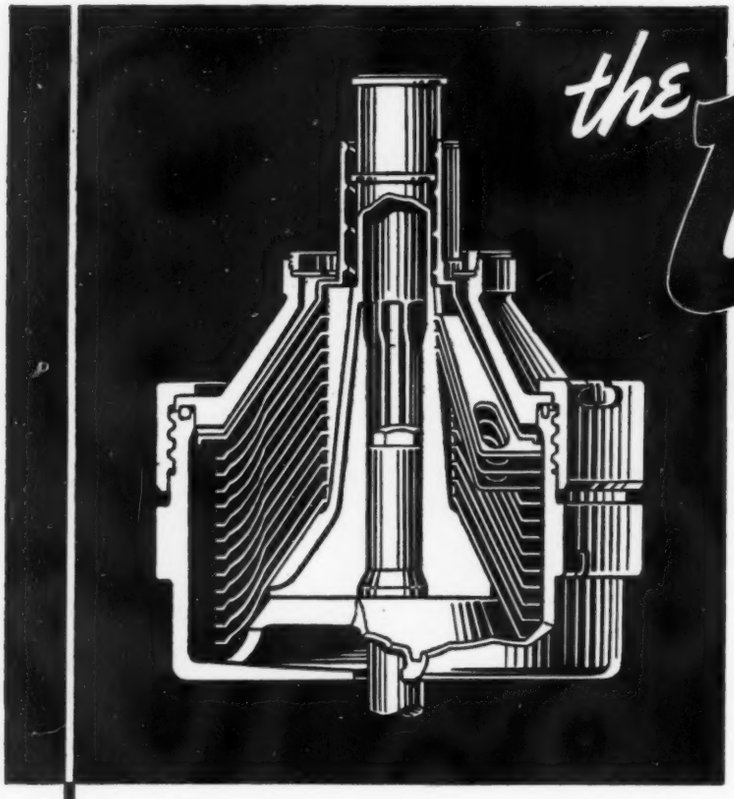
DISTRICT OFFICES IN PRINCIPAL CITIES

AIRCO

WILSON

Anything and Everything for **GAS WELDING or CUTTING and ARC WELDING**

IN AN OIL PURIFIER



the ★ BOWL is the thing

★ Discs in the De Laval Oil Purifier bowl stratify oil into thin sheets so that it is more easily and, hence, more completely purified. This principle has been applied in building De Laval bowls since 1890—twelve years after the invention of the first centrifugal separator by Dr. De Laval.

MORE impurities—and more different kinds of impurities—can be removed from oil by centrifugal force than by any other method. But the ultimate efficiency of centrifugal purification is realized only when the bowl, or purifying member, is skillfully designed to increase the effectiveness of centrifugal force.

Fifty years ago De Laval learned the secret of really harnessing centrifugal force to do a *better* job. The present, highly perfected De Laval disc type of bowl, which provides greater efficiency and capacity at lower speed—both uniformly maintained throughout long runs—is the result.

Look to the bowl of the oil purifier or coolant clarifier for the results you wish to secure. A more efficient bowl—a De Laval bowl—keeps oil or coolant in better condition and thereby helps insure better operation with low maintenance and oil costs.

Write today for illustrated literature.

De Laval

THE DE LAVAL SEPARATOR COMPANY
165 Broadway, New York, 427 Randolph St., Chicago
DE LAVAL PACIFIC CO., 61 Beale St., San Francisco
THE DE LAVAL COMPANY, Limited
Montreal Peterborough Winnipeg Vancouver

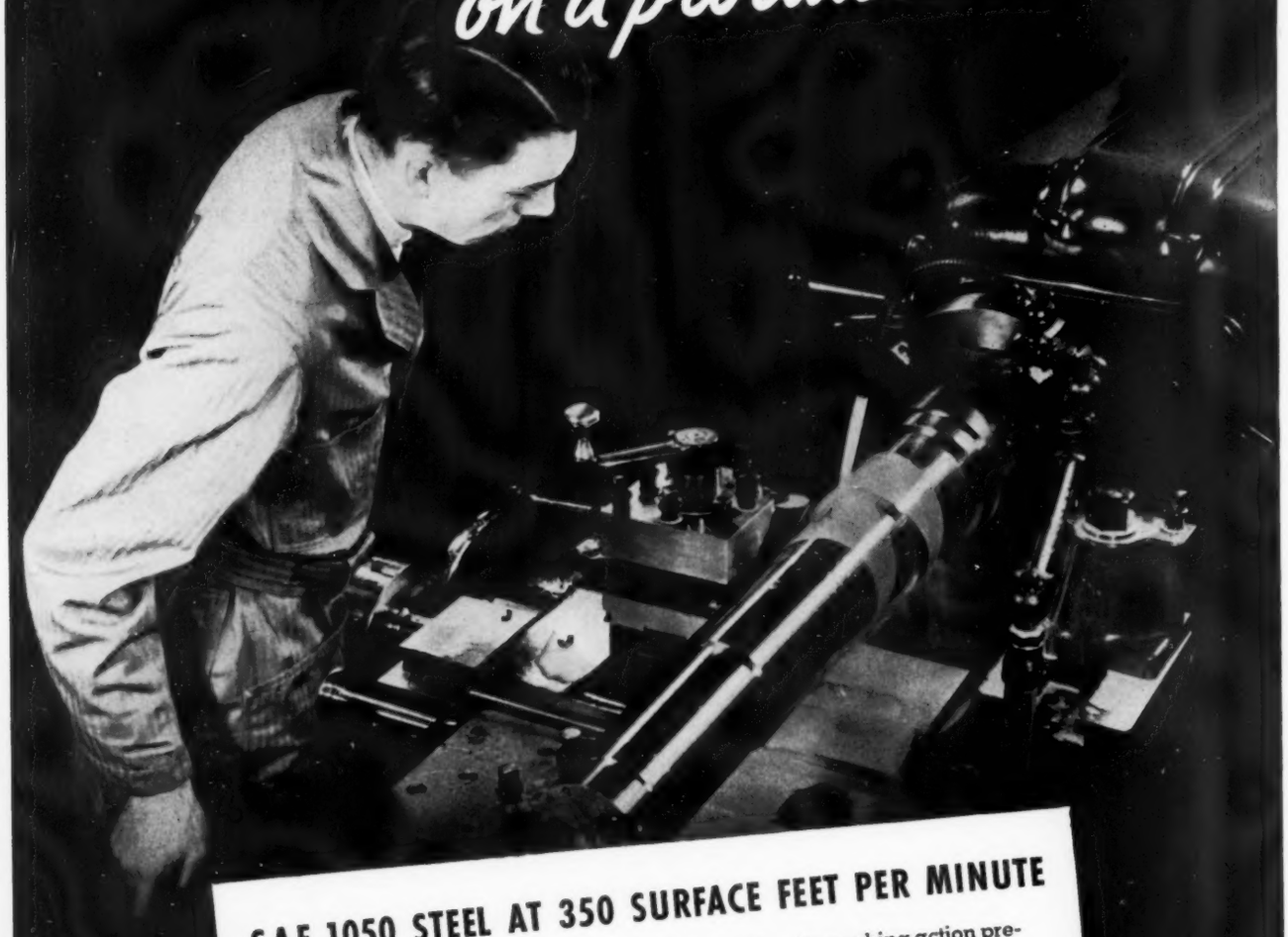
OIL PURIFIERS

Plant Service Equipment

POWER AND HAND TRUCKS • HOISTING EQUIPMENT • CONVEYOR PARTS • DRIVES, TRANSMISSIONS AND REDUCERS • HYDRAULIC PUMPS • CLUTCHES, COUPLINGS, PILLOW BLOCKS AND PULLEYS • BELTS, CONNECTORS AND DRESSINGS • LIGHTING EQUIPMENT • UNIT HEATERS • AIR COMPRESSORS AND CLEANERS • DRAFTING ROOM EQUIPMENT AND SUPPLIES • SAFETY EQUIPMENT

AMERICAN MACHINIST'S 28TH ANNUAL BUYERS REFERENCE NUMBER

SUNOCO PUTS ACCURACY AND FINE FINISH *on a production basis*



Removing 35 cu. inches of metal a minute on an 18" x 54" American Pacemaker Multi-Production Lathe.

SAE 1050 STEEL AT 350 SURFACE FEET PER MINUTE

When this is the order for production there must be the closest coordination between machine ... metal ... tools ... cutting lubricant ... and above all the mechanic.

That's why skilled mechanics throughout the metal working industry choose SUNOCO Emulsifying Cutting Oil, when it is necessary to take heavy cuts at high peripheral speeds with cemented carbide tools. They know the high heat absorbing and lubricating properties of Sunoco keep the work and tools cool ... its washing action prevents chips from clogging ... and produce more accurate work in less time.

Next time the production order looks tough take a tip from the leading machine tool builders. They know to save production time ... tools and material ... it pays to specify

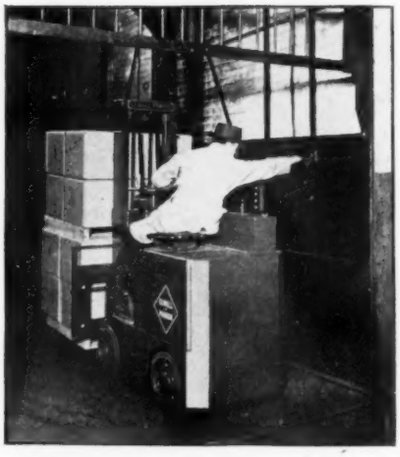
SUNOCO
EMULSIFYING
CUTTING OIL

Photograph Courtesy of American Tool Works Co.

SUN OILS

PETROLEUM PRODUCTS FOR ALL INDUSTRIES

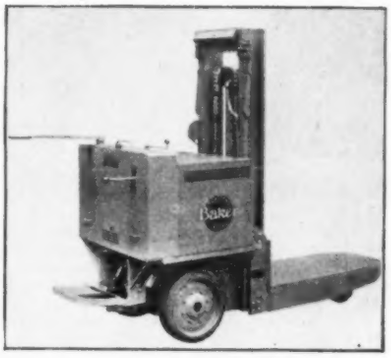
PLANT SERVICE EQUIPMENT



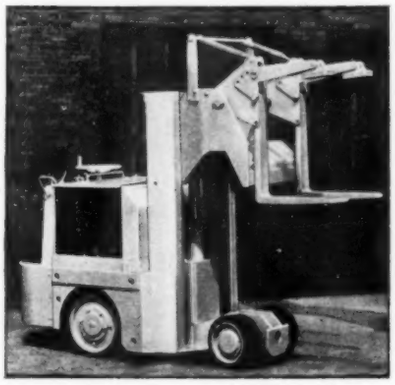
FORK TRUCK—*Elwell-Parker Electric Co., 4025 St. Clair Ave., Cleveland, Ohio.* "Cen-trol" power truck operates in cramped areas. It turns on a 46-in. radius, passes through doors 4½ ft. high, traverses aisles 48 in. wide, turns completely around inside a box car, and travels under load up ramps. It transports 2,000 lb. Vol. 84, p. 395.

FORK TRUCKS—*Baker-Raulang Co., 2168 W. 25th St., Cleveland, Ohio.* Gasoline-powered fork trucks in Type KM (non-telescoping) and Type KMH (telescoping) models are available in capacities of 4,000 and 6,000 lb. Engine is a four-cylinder Hercules industrial type. Gear box provides two speeds forward and two reverse. Hydraulic brakes are standard. Vol. 84, p. 74.

FORK TRUCK—*Clark Tructractor Div., Clark Equipment Co., Battle Creek, Mich.* "Utilitruc" lifting, carrying and tiering fork truck handles loads as heavy as 7,000 lb. and tiers them in piles over 15 ft. high. Gas-powered, it is made in several models, including straight lift, tilting and telescopic tiering. Vol. 84, p. 1038.

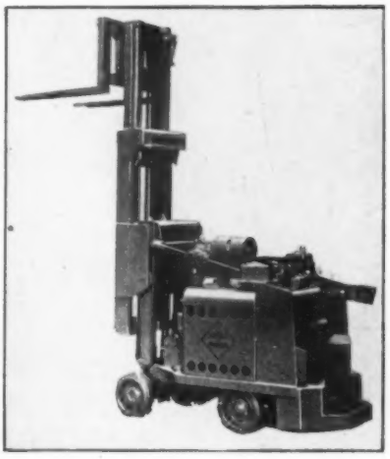


LIFT TRUCK—*Baker Industrial Truck Div., Baker-Raulang Co., Cleveland, Ohio.* Type H-2 Series F "Hy-Lift" 4,000-lb. truck operates in narrow aisles and congested areas. Standard simple lift is 60 in. Standard telescoping lift is 119 in. Vol. 84, p. 950.

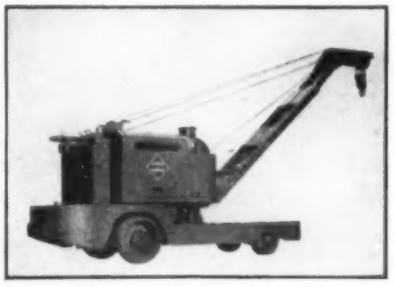


FORK TRUCK—*Mercury Mfg. Co., 4118 S. Halsted St., Chicago, Ill.* Model A-2440 fork truck with automatic clamps for handling tin plate and loose stacks of sheet metal is a two-wheel drive, four-wheel machine. Having a capacity of 4,000 lb., it loads up to 36 in. in length. Hoist mechanism is hydraulic. Vol. 84, p. 1000.

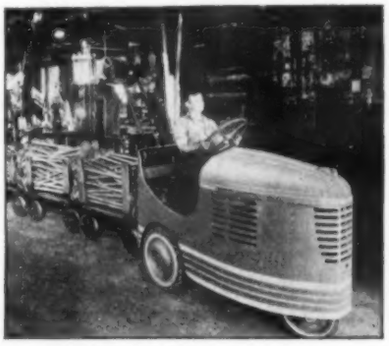
LIFT TRUCK—*Towmotor Co., 1264 E. 152nd St., Cleveland, Ohio.* Built on a 40-in. wheelbase for handling 3,000-lb. loads, Model No. LT-40 truck has a turning radius of 68 in., an over-all lift of 35 in., and a length without forks of 70 in. It is powered by a 22-hp. gas engine. Vol. 84, p. 893.



FORK TRUCK—*Elwell-Parker Electric Co., 4025 St. Clair Ave., Cleveland, Ohio.* Type ERS-3T fork truck elevates loads on skids or pallets to three levels. Forks can be raised to 50½ in. on the first lift, to 88½ in. on the second, and to 112 in. on the third. Rate of upward travel is 20 ft. per min., with a 1,500-lb. load. Vol. 84, p. 844.

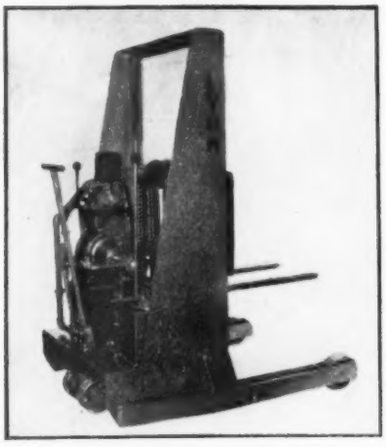


CRANE—*Elwell-Parker Electric Co., 4025 St. Clair Ave., Cleveland, Ohio.* No. C-4 crane has a rated capacity of 3,000 lb. at a 71-ft. radius and travels at speeds up to 5½ m.p.h. Standard telescoping boom, 12 to 19 ft. long, slews approximately 300 deg. in 20 sec. Hook speed varies from 30 to 50 ft. per min. Storage battery or gas-electric power is optional. Vol. 84, p. 444.

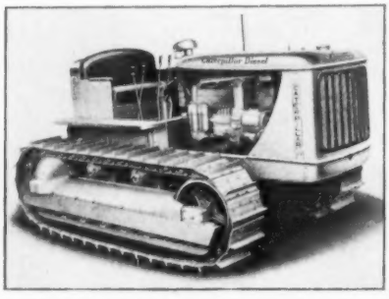


TRACTOR—*Clark Tructractor Div., Clark Equipment Co., Battle Creek, Mich.* "Clarkat" industrial tractor will pull 25 tons on trailers. Power is provided by a gasoline engine. Tractor has an over-all width of 38¼ in., a 57-in. turning radius, speed of 8 m.p.h., and is equipped with hydraulic brakes. Vol. 84, p. 263

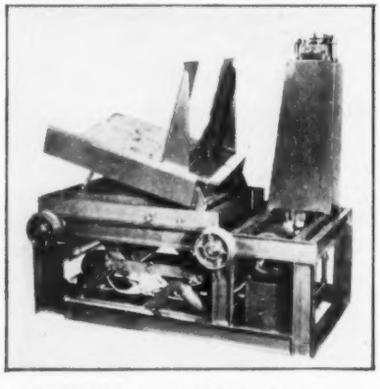
PLANT SERVICE EQUIPMENT—Trucks



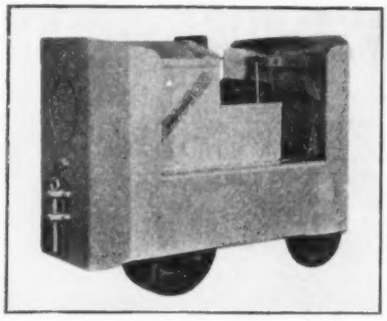
ELEVATING TRUCK—*Lyon Iron Works, 10 Madison St., Greene, N.Y.* A two-speed hydraulic hand pump and a motor-driven hydraulic pump are provided in this 3,000-lb. fork-type elevating truck. Forks are 27 in. long, 18 in. wide, and have a lowered height of 2 in. Elevated height is 48 in. Vol. 84, p. 439.



DIESEL TRACTOR—*Caterpillar Tractor Co., Peoria, Ill.* A light pull on the steering clutch lever is sufficient to steer this 23,500-lb. D7 diesel tractor. Belt horsepower is 87; drawbar, 75. Low-speed transmission provides five forward speeds from 1.4 to 5.0 m.p.h., while high-speed transmission has speeds from 1.4 to 6.0 m.p.h. Vol. 84, p. 69.

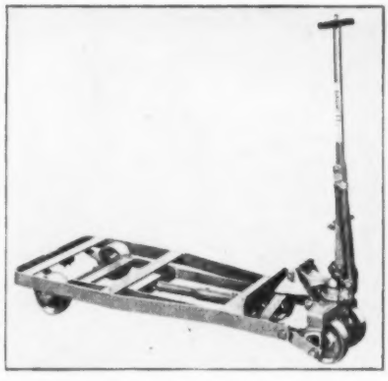


ELEVATING TRUCK—*Lyon Iron Works, 538 Madison St., Greene, N.Y.* Designed for unloading coils of strip steel from the recoiling machine, a 10,000-lb. capacity hydraulic elevating truck operates on a track approximately at floor level with its lower portion in a pit. Truck is of the toggle lever type for handling coils of steel up to 46 in. in diameter. Platform, 45 in. long, is fitted with an adjustable stop. Platform tilts 15 deg. from horizontal. Vol. 84, p. 780.



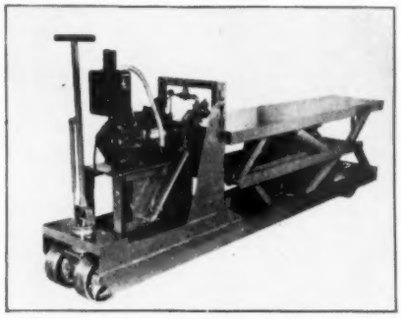
TRACTOR—*Towmotor Co., 1264 E. 152nd St., Cleveland, Ohio.* Especially advantageous in handling unwieldy loads of steel in tubes or sheets with long overhang, the Model CS "Towmotor" tractor has been designed for heavy-duty service. Over-all width is 42 in., length 71½ in., outside turning radius 74 in. Tractor has a drawbar pull of 4,000 lb. and will pull 130 tons on level concrete. Power plant develops 41 hp. at 2,000 r.p.m. and has with a three-speed transmission for speeds up to 8 m.p.h. Vol. 84, p. 478.

LIFT TRUCK—*Barrett-Cravens Co., 3255 W. 30th St., Chicago, Ill.* "Half Ton" lift truck has 2-in. lift for loads handled on skids, and can be used as a floor truck for bulkier single objects. It is of all-welded steel construction with ball bearings on all four wheels. Vol. 84, p. 350.

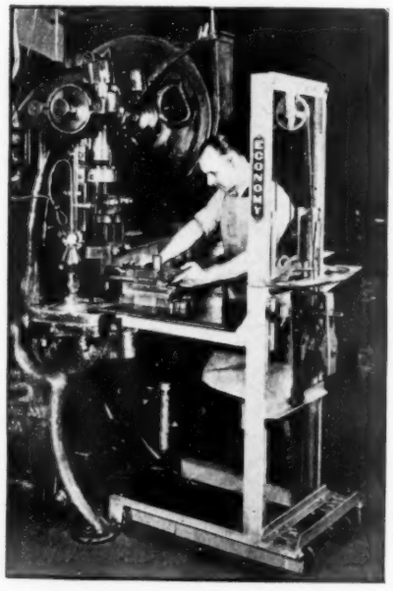


LIFT TRUCK—*Barrett-Cravens Co., 3255 W. 30th St., Chicago, Ill.* "Light Boy" Model GX lift truck has a capacity of 2,500 lb. and a 3-in. lift, accomplished with either four full or thirteen short strokes. It is made in sizes from 30 to 144 in. long in multiples of 6 in., and in widths of 18 and 24 in. Vol. 84, p. 1047.

LIFT TRUCK—*Barrett-Cravens Co., 3255 W. 30th St., Chicago, Ill.* This ½-ton ball bearing lift truck can be used either with or without skids. Made in platform heights of 3½, 6, 7 and 9 in., it is available only in 18 in. widths, with lift of 2 in. Vol. 84, p. 994.



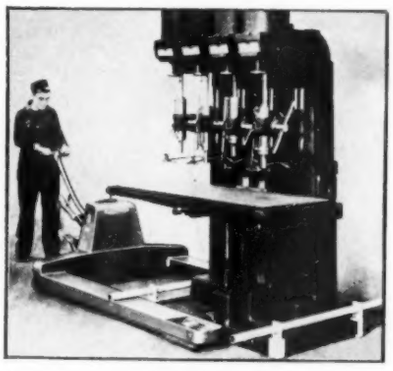
SHEET HANDLING TRUCK—*Lyon Iron Works, 10 Madison St., Greene, N.Y.* This sheet handling truck has a hydraulically elevated table of the toggle lever type. Pressure is furnished by a pump driven by a 2-hp. motor. Truck also is available with a hand-operated pump. Vol. 84, p. 69.



DIE LIFTER—*Economy Engineering Co., 2653 W. Van Buren St., Chicago, Ill.* "Shoplifter" die lifter can also be used as a truck for materials handling, and can serve as an adjustable table for machine work. A hand-operated hoist raises and lowers the platform to any desired height from 8¼ to 57 in. above the floor. Capacity of the unit is 500 lb. Vol. 84, p. 779.

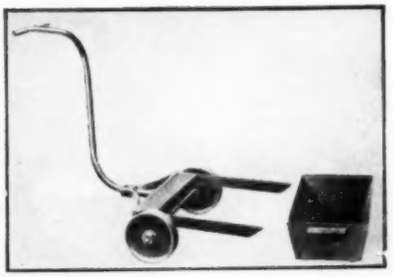
Trucks—PLANT SERVICE EQUIPMENT

DIE LIFTER—*Service Caster & Truck Co., 635 N. Brownswood Ave., Albion, Mich.* With this portable die lifter, dies can be taken from or replaced in the storage shelf, transported from storage to press, and placed in or removed from the press. Capacity is 4,000 lb. Over-all height is 8 ft.; total lift is 5 ft. 8 in. Lowered height of 30x36-in. platform is 11 in. Vol. 84, p. 686.



HYDRAULIC TRUCK—*Lewis-Shepard Sales Corp., 245 Walnut St., Watertown, Mass.* An open-end hydraulic lift truck is especially adapted for moving massive top-heavy machine tools. It provides speed and safety in raising and lowering loads, as it has extra-wide spreading arms and special levers for picking up heavy objects. Vol. 84, p. 900.

BARREL TRUCK—*Palmer-Shile Co., 7100 W. Jefferson Ave., Detroit, Mich.* This improved barrel truck is of all-welded steel construction and weighs only 85 lb. Barrels weighing up to 1,000 lb. can be loaded with ease. Vol. 84, p. 482.

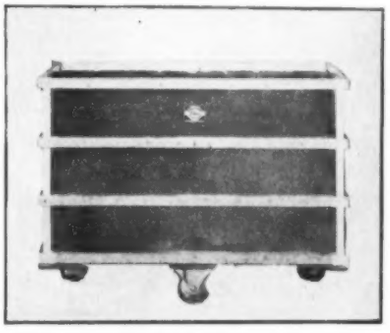


TOTE BOX TRUCK—*Barrett-Cravens Co., 3255 W. 30th St., Chicago, Ill.* A simple tote box truck reduces effort, speeds handling and reduces damage. Of all-welded steel construction, it will support any weight that can be carried in a 22x11-in. box. Vol. 84, p. 442.

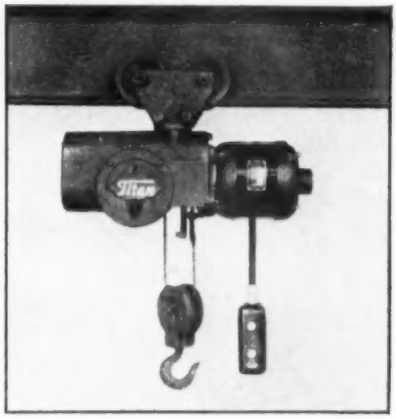
DIE TRUCKS—*O. Johnson Mfg. Co., Dept. K, 6027 W. Roosevelt Rd., Cicero, Ill.* Two flat top die trucks are of rigid electric-welded construction. No. F-1 has a 28x40-in. table and a capacity of 3,000 lb. No. F-2 has a 24x32-in. table and a capacity of 2,000 lb. Both provide an adjustable table height of 24 to 40 in. Vol. 84, p. 644.

CLEANING CART—*Palmer-Shile Co., 7100 W. Jefferson Ave., Detroit, Mich.* A shop clean-up cart that functions like a dust pan on wheels is mounted on ball bearing rubber-tired wheels. Vol. 84, p. 850.

DIE TRUCK—*Lyon Iron Works, 550 Madison St., Greene, N.Y.* On this die handling truck all four wheels can be steered. One wheel on each end is furnished with a brake. Capacity is 8,000 lb. Platform is 24 in. wide, 60 in. long and 30 in. high. Wheel base is 60 in.; over-all length is 72 in.; tread is 31 in.; and over-all width is 34 in. It can be furnished with a hydraulic elevating table. Vol. 84, p. 946.



HAND TRUCK—*Spaulding Fibre Co., 484 Broome St., New York, N.Y.* Style A factory truck combines long wearing quality, light weight and convenience of handling. It can be made to any dimensions. Vol. 84, p. 896.

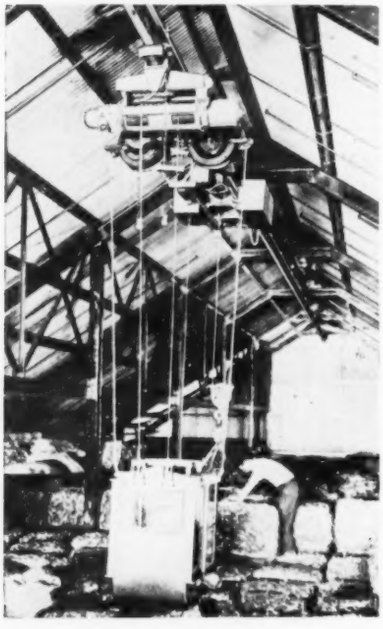


ELECTRIC HOIST—*Detroit Hoist & Machine Co., 8201 Morrow St., Detroit, Mich.* "Titan" electric hoist is a completely inclosed unit for lamp socket or power circuit operation. Hoisting speeds range up to 60 ft. per min. Vol. 84, p. 555.

DRUM TRUCK—*Morse Mfg., Co., 304 W. Jefferson St., Syracuse, N.Y.* Ease of loading is a principal feature of the No. 45 drum cradle truck, which provides a substantial wheelbase well under the drum center of gravity. Vol. 84, p. 786.

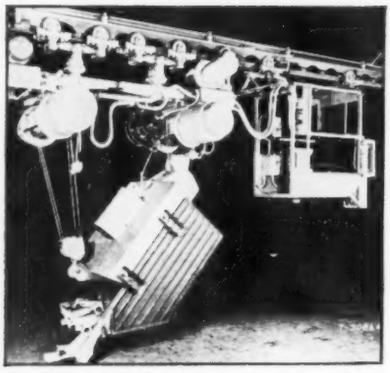
PLANT SERVICE EQUIPMENT—Hoists

HYDRAULIC LIFTER—*West Bend Equipment Co., West Bend, Wis.* Developed principally for use in handling heavy dies, the portable "Weld-Bilt" hand-operated hydraulic die lifter has a full hydraulic raising and lowering unit with finger-tip control located at the top of the operating handle. Platform has a lift of 4 ft. and lowers to within 8 in. of the floor. Capacity is 500 lb. Vol. 84, p. 479.

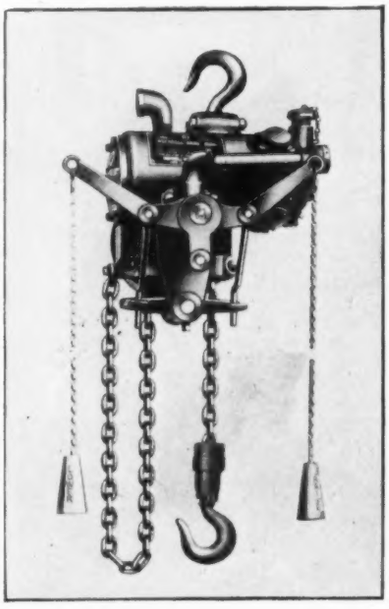


LOWERING CAB—*Cleveland Tramrail Div., Cleveland Crane & Engineering Co., Wickliffe, Ohio.* Tramrail carrier with raise-lower cab provides for raising and lowering of cab and load together, or for the cab and load to be raised and lowered independently. Load hoist, cab hoist and carrier are all motorized and controlled from the cab. Vol. 84, p. 1042.

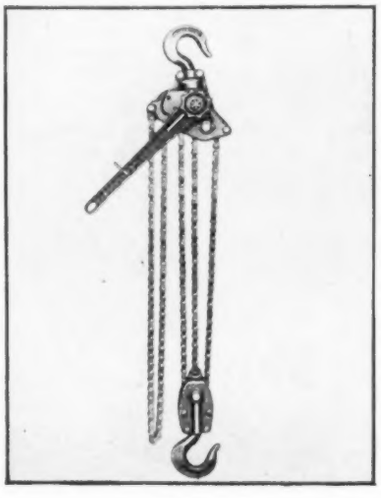
HOIST—*Philadelphia Div., Yale & Towne Mfg. Co., 4350 Tacony St., Philadelphia, Pa.* "Pul-Lift" 4½-ton portable hoist operates equally well in horizontal or vertical position. It has a ratchet handle with a universal action. Vol. 84, p. 1108.

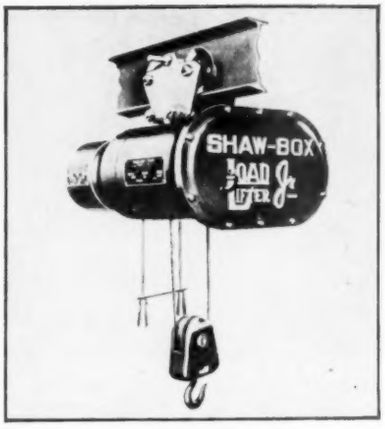


TRAMRAIL CARRIER — *Cleveland Tramrail Div., Cleveland Crane & Engineering Co., Wickliffe, Ohio.* This tilting box grab and tramrail carrier picks boxes up, sets them down, or empties them by tilting; all operations being manipulated by controllers in the cab. Unit illustrated handles 3 tons. Any size up to 5 tons may be furnished. Vol. 84, p. 642.

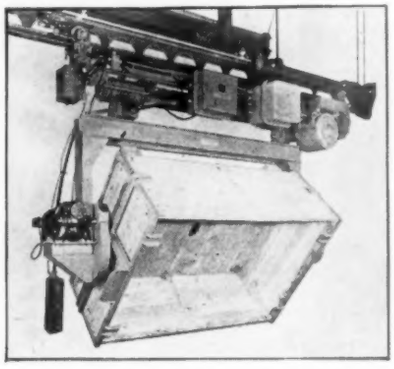


HOIST—*Ingersoll-Rand Co., Phillipsburg, N.J.* "Air-Bloc" hoist is available in three sizes, to handle loads of 300, 500 and 700 lb. Unit weighs less than 75 lb. Vol. 84, p. 939.

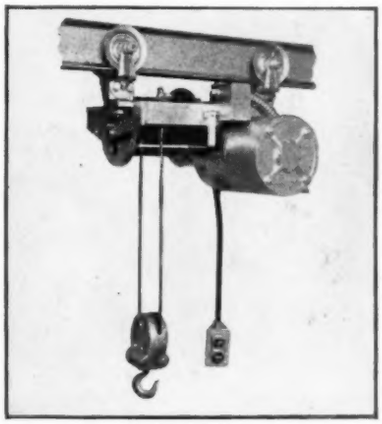




ELECTRIC HOIST—*Shaw-Box Crane & Hoist Div., Manning, Maxwell & Moore, Inc., Muskegon, Mich.* "Load Lifter Jr." heavy-duty, low-headroom electric hoists are available in 500 and 1,000 lb. capacities. Hook in its highest position comes within 12¼ in. of beam. Vol. 84, p. 265.

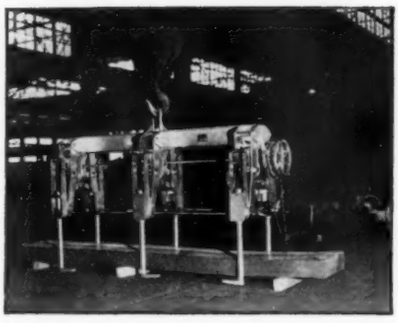


BOX GRAB UNIT—*Cleveland Tramrail Div., Cleveland Crane & Engineering Co., Wickliffe, Ohio.* This full-rotation box grab and tramrail carrier rotates boxes 360 deg. Unit shown is for boxes 48 in. wide, 72 in. long, and 30 in. deep, and will carry 2,000 lb. of material. It has a full-load hoisting speed of 20 ft. per min., and a travel speed of 150 ft. per min. Vol. 84, p. 266.

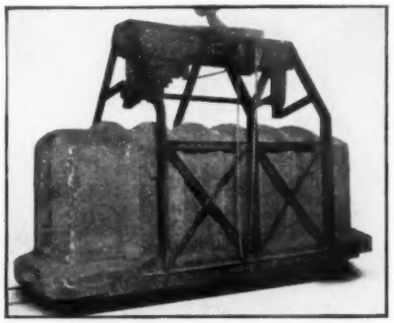


HOIST—*Electro Lift, Inc., 30 Church St., New York, N.Y.* This high-speed electric hoist has all castings made of aluminum alloy, making it suitable for use in steam and acid fumes. It is available in capacities from ⅛ to 3 tons. Vol. 84, p. 110.

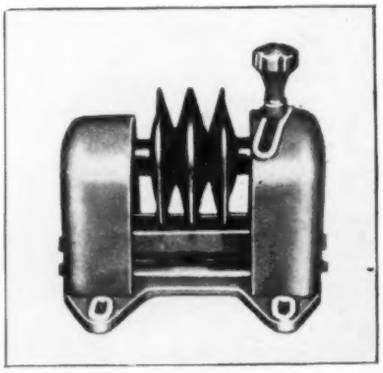
Cranes—PLANT SERVICE EQUIPMENT



SHEET LIFTER — *Cullen-Friestedt Co., 1313 S. Kilbourn Ave., Chicago, Ill.* This lifter handles two bundles of steel side by side, and also single bundles of various widths. Lifter illustrated is of 7-ton capacity. Vol. 84, p. 149.

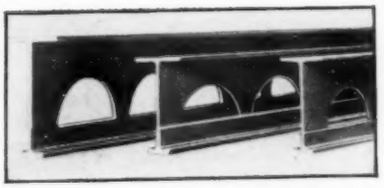


ANNEALING BOX LIFTER—*Cullen-Friestedt Co., 1313 S. Kilbourn Ave., Chicago, Ill.* This annealing box lifter eliminates warping of bottoms when handled hot. A continuous angle engages the bottom, in place of prongs. Lifter shown has 30-ton capacity and is operated by hand. Vol. 84, p. 398.

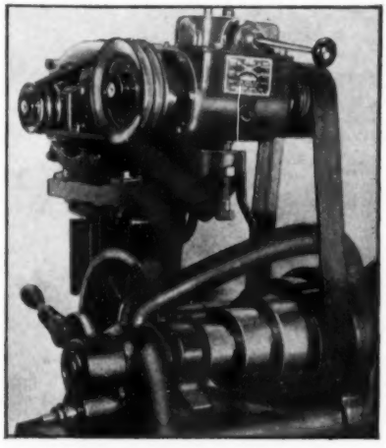


VARIABLE TRANSMISSION — *Standard Transmission Equipment Co., Suite 330, 416 W. 8th St., Los Angeles, Calif.* "All-Speed" V-belt variable speed transmission operates on the variable pulley principle, consisting of two interlocking pulleys mounted on a common shaft. Special impregnated bronze bearings are used. Unit is made in three sizes for ¾-in., A and B belts. It is available in speed ratios up to 12:1. Vol. 84, p. 784.

CANTILEVER CRANE — *Cleveland Crane & Engineering Co., Wickliffe, Ohio.* This crane has a cantilever extension which makes it possible for the trolley to go beyond the crane runway and convey loads into the adjacent bay. Capacity is 5 tons, with a span of approximately 37 ft. Vol. 84, p. 684.

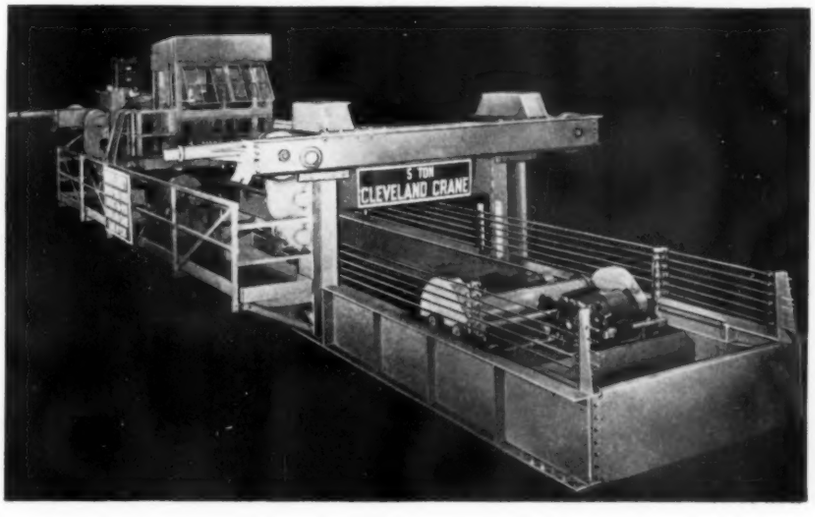


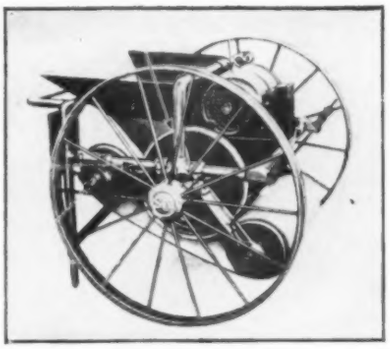
TRAMRAIL ARCH BEAMS—*Cleveland Tramrail Div., Cleveland Crane & Engineering Co., Wickliffe, Ohio.* A series of arch beams for overhead materials handling systems with loads up to five tons consists of three different beam sizes. No. 3000 has a depth of 12 in. and a weight of 28 lb. per ft. Having the same depth, No. 3100 weighs 33 lb. per ft. No. 3200 has a depth of 15 in. and weighs 50 lb. per ft. Vol. 84, p. 558.



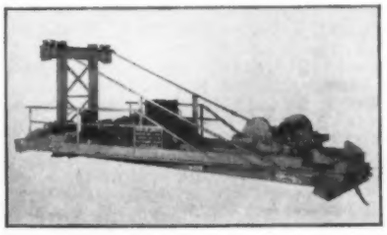
VARIABLE TRANSMISSION—*Western Mfg. Co., 3428 Scotten Ave., Detroit, Mich.* This line of variable-speed transmissions is especially designed for application to machine tools where a motor-driven, self-contained, selective-speed transmission is desirable. It provides four speeds forward and reverse. Three sizes are available of 1–5, 5–10, and over 10 hp. Vol. 84, p. 150.

WINCH—*Stephens-Adamson Mfg. Co., Aurora, Ill.* "Saco" speed reducer winch is furnished in a variety of sizes. A jaw clutch releases pulling rope. First reduction is through V-belts while the second is through helical gears. Vol. 84, p. 522.

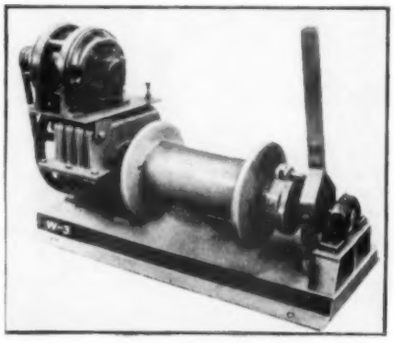




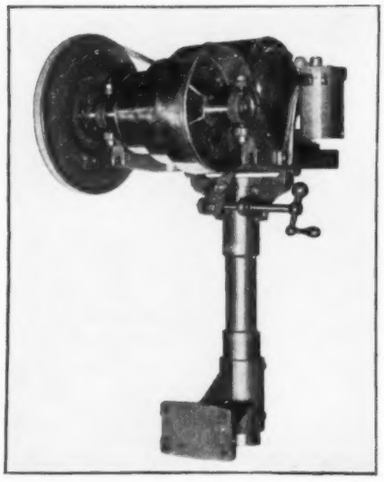
LOADER & PILER—*Stephens-Adamson Mfg. Co., Aurora, Ill.* This improved loader and piler is equipped with "Sealmaster" ball bearings, a simplified belt-alignment adjuster, and a redesigned frame. Vol. 84, p. 1046.



WALL CRANE—*Cleveland Crane & Engineering Co., Wickliffe, Ohio.* This wall crane has a 30-ft. horizontal reach. It has a capacity of five tons at 20 ft. and three tons at 30 ft. Total lift is 22 ft. Jib travel speed is 200 ft. per min., trolley speed 75 ft. per min., hoisting speed 30 ft. per min. Vol. 84, p. 400.

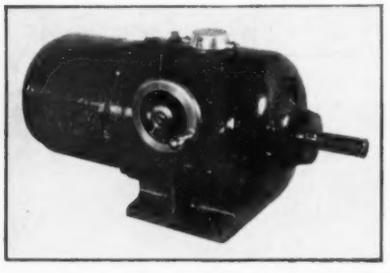


PLANT SERVICE EQUIPMENT—Transmissions



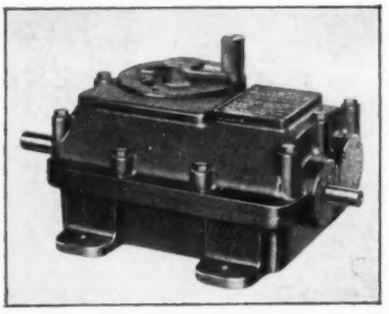
INDIVIDUAL DRIVES — *Quality Hardware & Machine Co., 5847 N. Ravenswood Ave., Chicago, Ill.* Fifteen models of "Modern" individual motor drives for belt-driven lathes, shapers, milling machines, turret lathes and other machine tools, are complete, self-contained units, including motor mounting. Crank-and-screw control actuates a cam working against the base of the motor and drive shaft mounting, providing wide adjustment. Vol. 84, p. 314.

VARIABLE PULLEY—*Columbia Vari-Speed Co., P. O. Box 447, Wheaton, Ill.* Improvements in the "JFS-Jr. Vari-Speed" control include long bronze bushings on the center pulley halves. Larger double sealed ball bearings are provided. Vol. 84, p. 482.

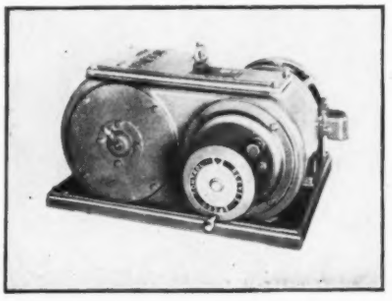


VARIABLE TRANSMISSION—*Lenney Machine & Mfg. Co., 733 Niles Rd., Warren, Ohio.* This redesigned variable transmission has a speed range of 225 to 925 r.p.m. when driven by a 1,750-r.p.m. motor. Automatic pressure regulating clutch is actuated by the load at the output shaft, thus preventing slipping. Speed indicator dial is conveniently located on top. Vol. 84, p. 354.

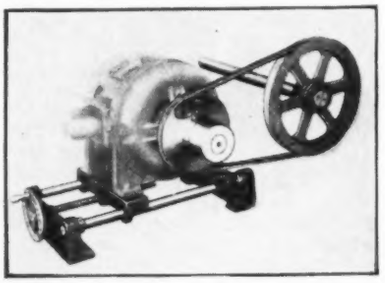
SPEED REDUCER—*Abart Gear & Machine Co., 4832 W. 16th St., Chicago, Ill.* Capable of handling 2 hp., Type 2⅝ A worm gear speed reducer weighs 22 lb., with ratios ranging from 4⅝ : 1 to 100 :1. Vol. 84, p. 596.



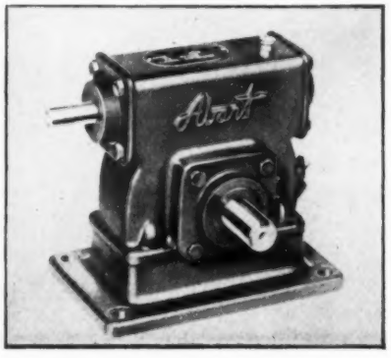
SPEED REDUCER—*Adams Co., 111 E. Sixth St., Dubuque, Iowa.* Type MD "MultiSpeed" reducers are arranged so that speed is changed by sliding spur gears. A single lever control provides four output shaft speeds. Units are available in fourteen sizes with capacities from 17.17 to 28.75 hp. at 1,000 r.p.m. Vol. 84, p. 32.

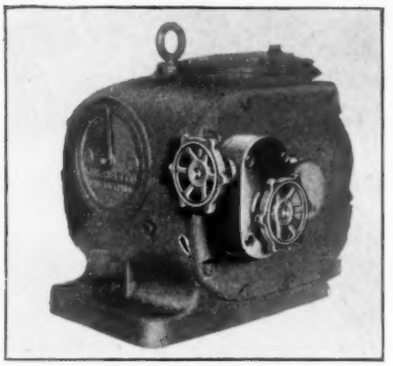


TRANSMISSION CONTROL—*Reeves Pulley Co., Columbus, Ind.* "Speedial," an improved combination hand wheel and speed indicator for use with its variable-speed transmission, "Vari-speed" motor pulley and "Motodrive," accurately indicates speed settings. Ratios of 20 :1, 30 :1 and 60 :1 are available. Vol. 84, p. 596.

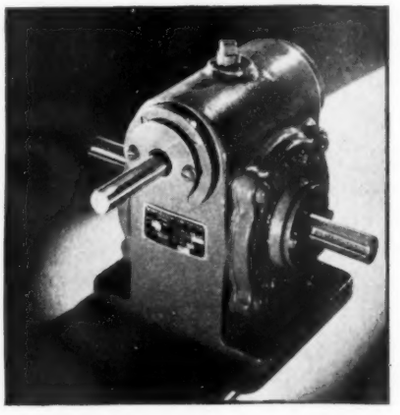


TRANSMISSION—*Reeves Pulley Co., Columbus, Ind.* "Vari-Speed Jr." transmission can be used with any constant-speed motor up to 1½ hp. No special shaft extension is required. Speed control over a range of 1¾ :1 to 2¾ :1 is provided. Vol. 84, p. 692.

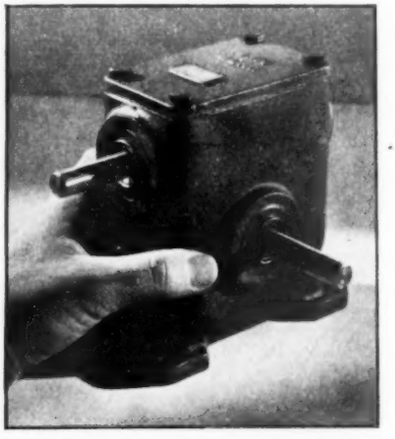




VARIABLE-TRANSMISSION CONTROL—*Link-Belt Co., 307 N. Michigan Ave., Chicago, Ill.* All sizes of the "P.I.V.-Speed Gear" variable transmission can be equipped with a vernier control unit for installations where extremely fine control of speed changes is required. This control can be supplied with ratios of 7½ : 1 or 30 : 1. Vol. 84, p. 76.

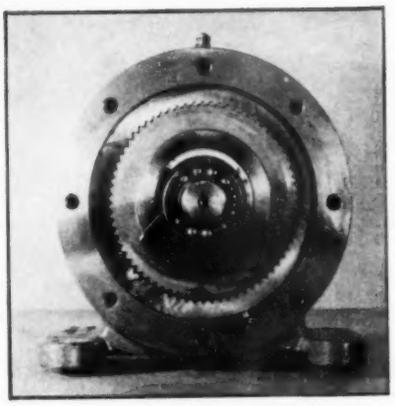


SPEED REDUCER — *Winfield H. Smith, Inc., Springville, N. Y.* No. 3½ BT worm gear speed reducer embodies a hardened steel worm with ground threads keyed to the shaft which is mounted on radial thrust type ball bearings. Gears are of special alloy bearing bronze. Ratios of 58, 36, 18 and 9 to 1 are available, in the ¼-hp. rating with a torque capacity up to 190 in.-lb. Unit measures 6½ in. high, 4⅛ in. wide and 5 in. long. Vol. 84, p. 996.

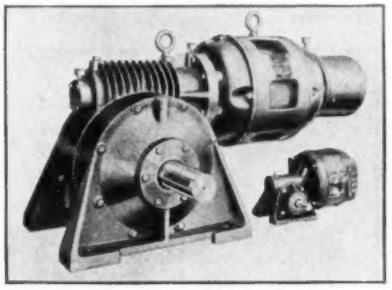


SPEED REDUCER—*Ohio Gear Co., E. 179th St. & St. Clair Ave., Cleveland, Ohio.* BHU speed reducer has output shaft projecting to right, to left or to both right and left. Only 5⅜ in. long, 3 in. wide and 5⅝ in. high, this fractional-horsepower reducer is available in stock ratios between 10 :1 and 48 :1. Torque capacity is 150 in.-lb. Vol. 84, p. 1106.

Transmissions—PLANT SERVICE EQUIPMENT



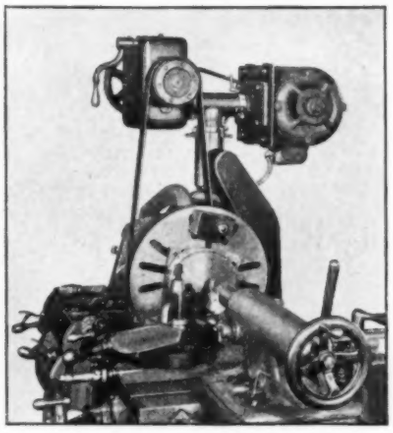
SPEED REDUCER—*Brad Foote Gear Works, 1301 S. Cicero Ave., Chicago, Ill.* Compact speed reducer has high ratios without large gears. Vol. 84, p. 264.



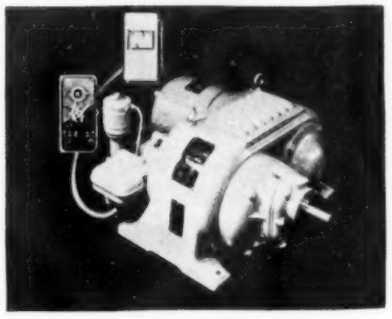
GEAR REDUCERS—*Janette Mfg. Co., 556–558 W. Monroe St., Chicago, Ill.* Type RW worm gear reducers are built in six sizes up to 10 hp. Smallest and largest are illustrated. Single-phase, squirrel-cage, slip ring and d.c. motors can be used, giving output speeds of 12.7 to 447 r.p.m. Type RWP reducers feature a combination of worm and planetary gearing. They are supplied in four sizes, with motors of 1.6 to 10 hp., producing speeds from 5.9 to 52 r.p.m. Vol. 84, p. 352.

SPEED REDUCERS—*American Pulley Co., Philadelphia, Pa.* Only five reduction units, each with a 13:1 ratio, cover all applications from ½ to 30 hp. and provide any desired speed between 11 and 215 r.p.m. with standard equipment. Gear reduction unit mounts directly on the shaft. Vol. 84, p. 1050.

PUMPS—*Oilgear Co., 1302A W. Bruce St., Milwaukee, Wis.* Type DX two-way three-position variable displacement pumps, for use with remote pushbutton control, are available in sizes from 2 to 150 hp. Each is made for pressures of 1,100, 1,700 and 2,500 lb per sq. in. and for peak pressures up to 3,000 lb. per sq.in. All pumps are equipped with built-in auxiliary gear pumps for supercharging the high pressure unit, for operating the pump control mechanism and for other purposes. Vol. 84, p. 736.

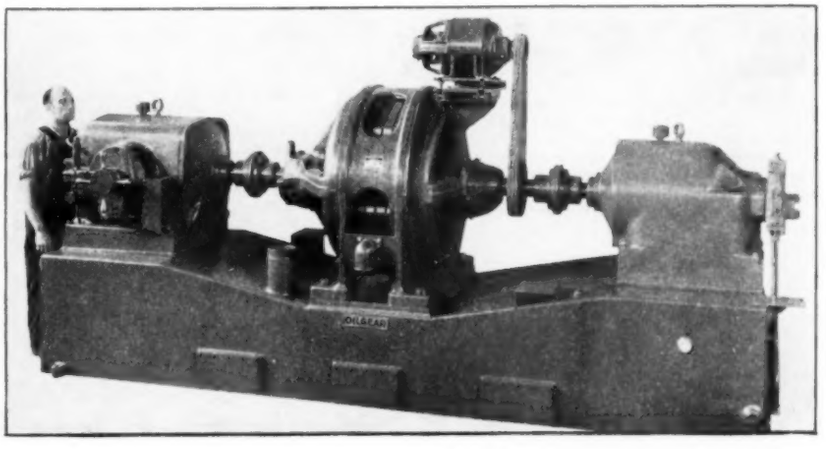


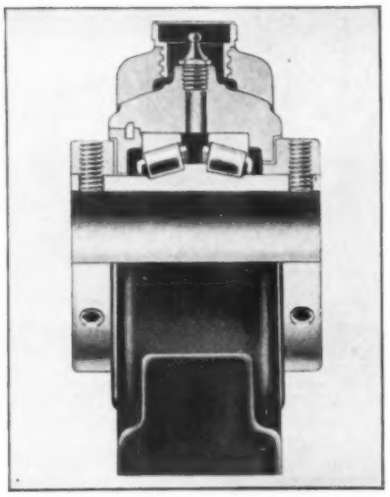
TOOL DRIVE—*Berkeley Equipment Co., Corry, Pa.* Either a 3- or 4-speed selective sliding gear transmission can be furnished on these motorized machine tool drives. Mounted on specially designed custom-built welded steel brackets, they can be easily applied to all types of tools. Vol. 84, p. 941.



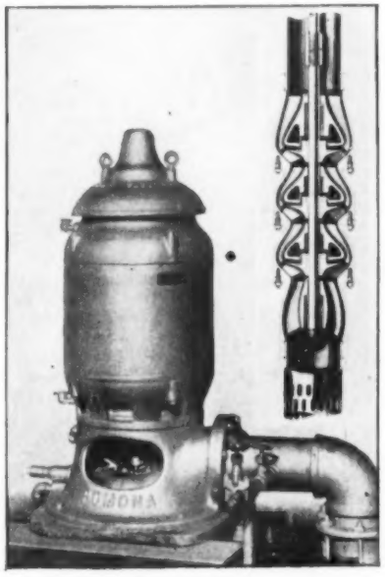
TRANSMISSION CONTROL—*U. S. Electrical Motors, Inc., Dept. 23, 80 34th St., Brooklyn, N. Y.* Electric remote control for "Varidrive" motors makes possible automatic adjustment of take-off shaft speed by means of a thermostat, float switch or other control. Vol. 84, p. 648.

TURBINE PUMP—*Pomona Pump Co., 660 E. Commercial St., Pomona, Calif.* Line of 6-in. medium capacity vertical turbine pumps has been redesigned to increase efficiency. Smaller motors are used, number of stages has been reduced and initial cost lowered. Advantages include water lubrication, semi-open impeller adjustable from the surface, and non-sandlocking and non-gaslocking characteristics. Vol. 84, p. 783.

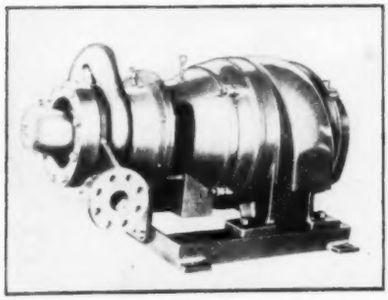




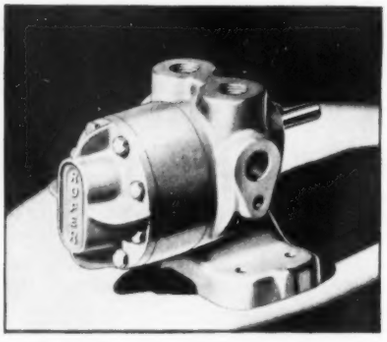
PILLOW BLOCK—*Dodge Mfg. Corp., Mishawaka, Ind.* Dodge-Timken double interlock pillow block has been designed for simplified mounting on ordinary commercial shafting where lighter loads are to be carried than those requiring a clamp sleeve type bearing. This unit uses a special duplex Timken roller bearing with long inner race ring. It is made in both expansion and non-expansion types, for shaft sizes from 1⅝ to 5 in. Vol. 84, p. 316.



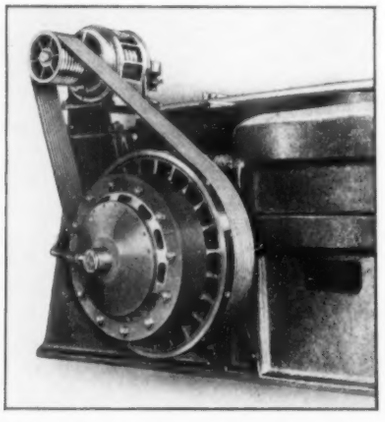
PLANT SERVICE EQUIPMENT—Pumps, Bearings



PUMP—*Allis-Chalmers Mfg. Co., Milwaukee, Wis.* Multi-stage "SSUnit" pumps include a two-stage pump with 4-in. suction and 2-in. discharge, rated up to 275 gal. per min. against heads up to 50 ft. at a speed of 3,550 r.p.m. Vol. 84, p. 596.

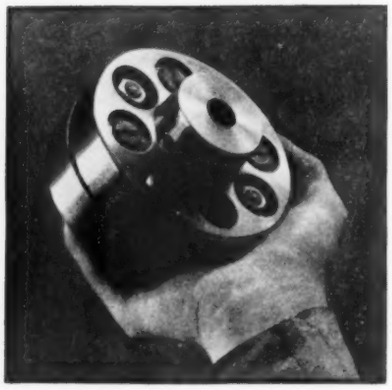


PUMPS—*Geo. D. Roper Corp., Rockford, Ill.* Rotary pumps include capacities of 1 to 1,000 gal. per min. at speeds up to 1,800 r.p.m. against pressures up to 1,000 lb. per sq.in. 21 different drives and mountings are available. Features include hydraulic balance, choice of helical, spur or herringbone gears, choice of seals and bearings. Vol. 84, p. 226.



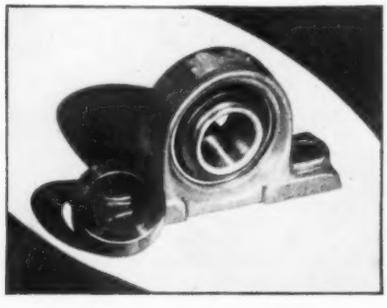
CLUTCH—*National Machinery Co., Tiffin, Ohio.* A line of heavy-duty air-cooled friction clutches has been developed especially for high-duty forging machines. All driving and driven plates and driving pinions can be removed without removing the flywheel. Vol. 84, p. 262.

PUMP—*Allis-Chalmers Mfg. Co., Milwaukee, Wis.* "Electrifugal" pump is an all-in-one centrifugal pump available with splash-proof, totally enclosed, fan-cooled and explosion-proof motors. In splash-proof construction it is available in sizes from 1 to 10 hp. at 3,500 r.p.m., and from ¾ to 7½ hp. at 1,750 r.p.m. for heads up to 160 ft. Vol. 84, p. 946.

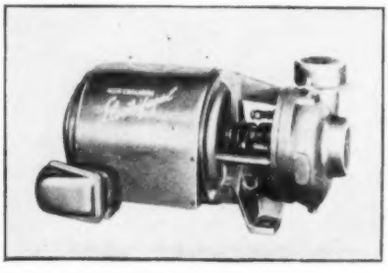


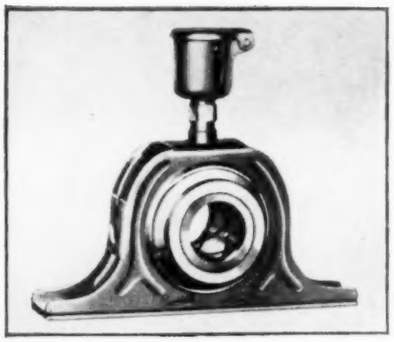
COUPLING—*Ajax Flexible Coupling Co., Westfield, N. Y.* Two forged steel flexible couplings with 1⅛ and 1⅝ in. maximum bores are designed for heavy-duty service. Rubber bushings and graphite bronze bearings provide resilient flexibility. Vol. 84, p. 446.

HANGER BEARINGS — *Stephens-Adamson Mfg. Co., Aurora, Ill.* "Sealmaster" ball bearing hanger bearings are intended especially for screw conveyor service. They are made in shaft sizes from $1\frac{7}{16}$ to $2\frac{15}{16}$ in. Vol. 84, p. 900.

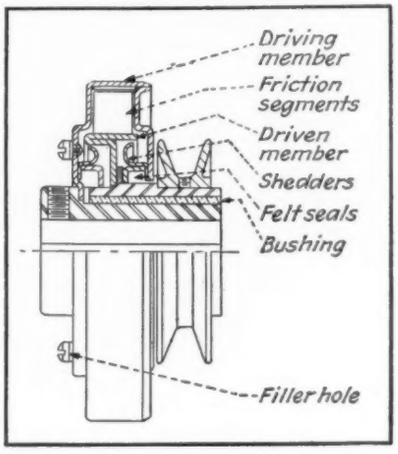


PILLOW BLOCK—*Fafnir Bearing Co., New Britain, Conn.* "Mechani-Seal" ball bearing pillow blocks, flange cartridges and cylindrical cartridges offer efficient seals. Vol. 84, p. 996.

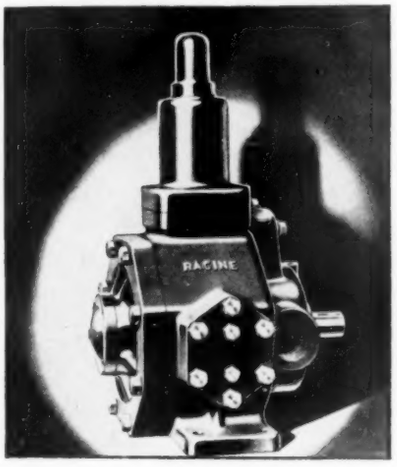




PILLOW BLOCK—*Randall Graphite Products Corp., 609–613 W. Lake St., Chicago, Ill.* This large pillow block having a one-piece steel housing fits shafts of $1\frac{1}{16}$ to $1\frac{5}{16}$ in. diameters. Unit features selective mounting positions, constant self-alignment, self-lubrication. Entire assembly consists of only three parts: one-piece steel housing, machined cast-iron ball with large oil reservoir, and bronze bushing with graphite-filled grooves. Vol. 84, p. 314.

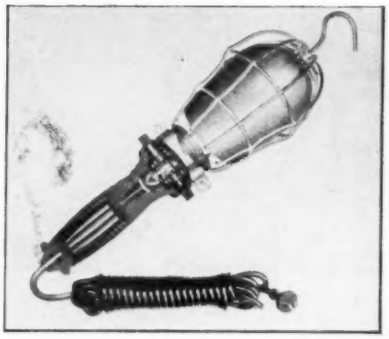


CLUTCH—*Mercury Clutch Corp., Massillon, Ohio.* This "Mercury" transmission clutch, utilizing mercury to displace friction segments by centrifugal force, permits a driving motor to gain speed before assuming load. 4 and 4¼ in. sizes are standard. These will transmit loads up to 5 hp. Vol. 84, p. 393.

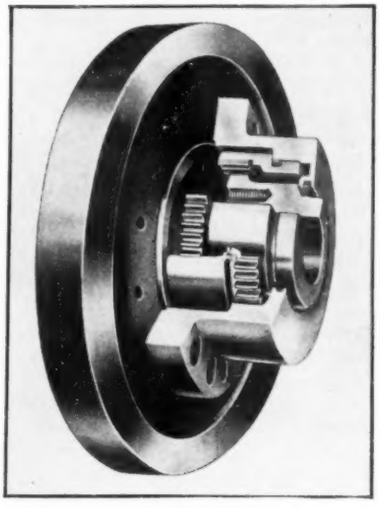


PUMP—*Racine Tool & Machine Co., Racine, Wis.* Rated at 1,000 lb. per sq.in. continuous pressure, a variable-volume hydraulic pump features hydraulic vane balancing by improved side plate porting. Features include large shaft; large needle bearings, mechanical self-compensating oil seals, and hardened and ground vanes and rotor. Pump is also furnished with manual handwheel. Vol. 84, p. 441.

Lighting Units—PLANT SERVICE EQUIPMENT



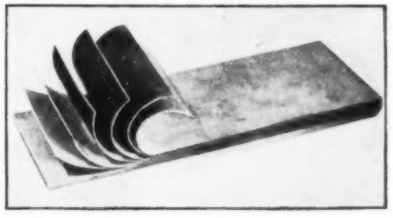
PORTABLE LIGHT—*Royal Electric Co., 95 Grand Ave., Pawtucket, R. I.* A rubber switch button completely envelopes interior pushbuttons in the "Sealed Tight" portable trouble light. Socket is locked in rubber so that oil, grease or dirt cannot reach switch or electrical contacts. Vol. 84, p. 114.



COUPLING—*Farrel-Birmingham Co., Buffalo, N. Y.* "Manger" coupling provides complete flexibility with approximately one-half the axial clearance usually required. Compensation is provided for offset, angular and combined misalignment without resistance to free lateral float of connected shafts. Vol. 84, p. 1099.

DIFFUSION UNIT—*Edwin F. Guth Co., 2615 Washington Blvd., St. Louis, Mo.* A plastic device (not shown) which snaps onto a fluorescent lamp to reduce glare from bare tubes is applicable to 1- and 1½-in. lamps. It is available in five colors. Vol. 84, p. 555.

LAMP CONTROLS—*Wiremold Co., Hartford, Conn.* A complete series of auxiliaries (not shown) for use with fluorescent lamps is available. Compact two-lamp controls have high power factor, reduced stroboscopic effect and built-in compensators. Vol. 84, p. 485.



BELTING—*Fabrecka Products Co., Boston, Mass.* "Fabco" power belting is said to be the first belting to offer advantages of multiple thin-ply construction, giving high flexibility and permitting it to withstand severe distortion in passing over small pulleys. Vol. 84, p. 600.

FLASHLIGHT EXTENSION—*Sierra Aircraft Co., Sierra Madre, Calif.* Available in lengths from 6 to 36 in., this extension screws into any flashlight. Made of high quality aluminum, it is extremely flexible. Vol. 84, p. 596.

LAMP CAPACITOR—*Aerovox Corp., New Bedford, Mass.* To be included in fixtures as built-in equipment, or to be added subsequently, capacitors (not shown) designed especially for fluorescent lamp power-factor correction are of the oil-filled paper type within a hermetically sealed flat metal can. Vol. 84, p. 522.

V-BELT—*B. F. Goodrich Co., Akron, Ohio.* This V-belt (not shown) prevents accumulation of static electricity and retains static-discharging qualities throughout its entire service life. Resistance built into the belt is just enough so that the belt itself cannot act as a direct conductor of current. Vol. 84, p. 1000.

FLASHLIGHT BATTERY—*Ideal Commutator Dresser Co., 1057 Park Ave., Sycamore, Ill.* A rechargeable flashlight battery is said to give dependable long life and to be economical in heavy-duty service. Specially designed chamber and vent and semi-fixation of electrolyte make the battery spill-proof. A small charger plugs into any 110-volt 60-cycle socket. Recommended charging time is 12 hours. Vol. 84, p. 786.

FLUORESCENT FIXTURE — *Hygrade Sylvania Corp., Salem, Mass.* "Hygrade Miralume HF-200" fluorescent lighting unit (not shown) is supplied complete with four 40-watt, 48-in. fluorescent lamps and with all wiring and fittings, ready to install, corrected for power factor and stroboscopic effect. Units are available for 110–125 volt and 220–250 volt 60-cycle operation. Vol. 84, p. 115.

V-BELT—*Browning Mfg. Co., Maysville, Ky.* Heat, oil, gasoline and similar agents which deteriorate ordinary V-belts are claimed to have no harmful effect on oilproof "Gripbelts" (not shown). Belts are claimed to contain no rubber, being made entirely from synthetic gums. Although they can generate static, they are claimed to be non-sparking. Vol. 84, p. 1048.

REFLECTOR—*Holophane Co., 342 Madison Ave., New York, N. Y.* "Cranelite" reflectors withstand severe service of under-crane mounting. They are suspended by three compound double-acting steel springs. Vol. 84, p. 349.

FLUORESCENT FIXTURE—*General Electric Co., Nela Park, Cleveland, Ohio.* A two-tube "RF" fluorescent luminaire (not shown) especially suited for industrial areas consists of a self-contained auxiliary mounted on a porcelain enamel reflector. It is rated at 200 watts and operates two 85-watt "RF" tubes each 58 in. long. These tubes have a combined initial rating of over 8,000 lumens. Vol. 84, p. 315.

FLUORESCENT FIXTURE—*Westinghouse Electric & Mfg. Co., Cleveland, Ohio.* A 48-in. twin-lamp "RLM" fluorescent luminaire (not shown) with spread distribution for general or supplementary lighting in low-bay industrial areas is furnished wired complete with hood, reflector, lamp holder, lamp starter and ballast equipment for 110–125, 199–216, or 220–250 volt circuits. Vol. 84, p. 315.

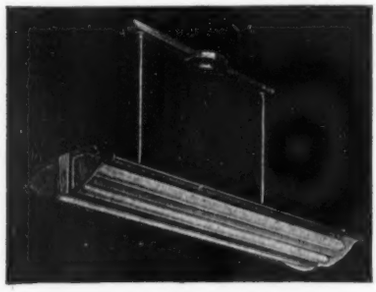
FLUORESCENT LAMP—*Lamp Div., Westinghouse Electric & Mfg. Co., Bloomfield, N. J.* A 58-in. 85-watt Type RF fluorescent lamp (not shown) producing white light, designed especially for industrial service, may be operated on either 105–125 volt or 210–250 volt 60 cycle a.c. Light output is rated at 4,250 lumens. Vol. 84, p. 402.

FLUORESCENT FIXTURE—*Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa.* A twin lamp open end fluorescent fixture (not shown) is for general or supplementary continuous strip lighting in low bay industrial areas. This type FPC luminaire is available only in spread distribution style, utilizing two 40-watt 48-in. fluorescent lamps. Vol. 84, p. 850.

PLANT SERVICE EQUIPMENT—Lighting Units

FLUORESCENT UNIT—*Van Dyke Industries, 2900 Halsted St., Chicago, Ill.* No. 5000 adjustable fluorescent lighting unit (not shown) has three extension joints which permit light to be thrown in any direction. Units are available for either a.c. or d.c. operation. Also available is the No. 3001 screw-in socket fluorescent lamp for use over production lines and for general illumination. Vol. 84, p. 560.

FLUORESCENT FIXTURE — *Hygrade Sylvania Corp., Salem, Mass.* Employing two 40-watt fluorescent lamps, No. C-101 "Miralume" fluorescent lighting unit is designed for general commercial illumination. Lamps and chassis are housed in a triangular glass-paneled shade. Over-all dimensions: length, 49 in.; width, 10 in.; height, 4½ in. Vol. 84, p. 558.



DRAFTING LAMPS—*Edwin F. Guth Co., 2615 Washington Blvd., St. Louis, Mo.* "Tru-Co-Lite" fluorescent lighting units provide lighting equivalent to combination direct and indirect illumination, which is especially suitable for drafting. Aluminum reflectors finished by the Alzak process deliver 85 per cent downlight with wide light distribution, and 15 per cent uplight for ceiling illumination. Unit takes four 40-watt or four 20-watt lamps. Vol. 84, p. 598.

FLUORESCENT FIXTURES—*Edwin F. Guth Co., 2615 Washington Ave., St. Louis, Mo.* Utility "Flu-O-Flector" (not shown) provides a separate inner reflector and a protective steel housing, the reflector being removed by unscrewing two large knurled nuts. With extra reflectors at hand, maintenance crews simply take down dirty reflectors and substitute clean ones. Vol. 84, p. 648.

FLUORESCENT FIXTURES—*Miller Co., Meriden, Conn.* "Masterlite" fluorescent lighting units (not shown) provide general and localized industrial illumination, using two 40-watt 48-in. tubes. The "50 Footcandler" for general illumination is available in either single or double length wiring channels for two or three 40-watt lamps. Vol. 84, p. 951.

FLUORESCENT FIXTURE — *Benjamin Electric Mfg. Co., 120–128 S. Sangamon St., Des Plaines, Ill.* "Sealed-Flo" fluorescent fixture features a sealed cover which protects lamps and reflectors from dust and dirt and permits use in locations requiring vapor-proof and dust-tight fixtures. Units are available for two or three 48-in. lamps. Vol. 84, p. 600.

MUSHROOM LAMP—*Warren Lamp Co., Warren, Pa.* Inside silver plating as a reflector makes the "Deluxe" mushroom lamp immune to dirt, fumes, and cleaning. Lamps are available in sizes from 75 to 300 watts. Vol. 84, p. 442.

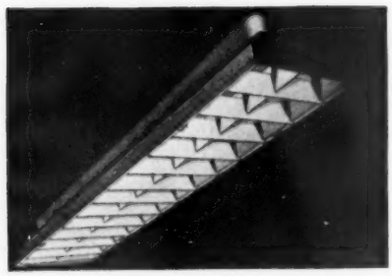
LIGHTING FIXTURES — *Wiremold Co., Hartford, Conn.* Available are a line of wired and unwired fluorescent units, and two complete related "Plugmold" multiple outlet systems (not shown). Fluorescent units are available in unit lengths, for any specified size and number of lamps, with or without reflectors of either concentrating or diffusing types. Smaller No. 1900 "Plugmold" multiple outlet system has a capacity of two wires for single circuits. Large No. 2100 system has a capacity of six wires. Vol. 84, p. 51.

FLUORESCENT FIXTURE — *Hygrade Sylvania Corp., Salem, Mass.* No. C-205 200-watt "Miralume" lighting fixture (not shown) makes use of four 40-watt fluorescent lamps, either daylight or white. It is 49 in. long, 14½ in. wide, and 7½ in. high. Vol. 84, p. 1108.

FLUORESCENT LAMP — *Westinghouse Lamp Div., Bloomfield, N. J.* A 100-watt Mazda fluorescent lamp (not shown) available in 3,500 F. white color, has a rated initial output of 4,400 lumens and a rated life of 2,000 hours. Vol. 84, p. 1042.

"MEKANIX-LITE"—*Emeloid Co., 287 Laurel Ave., Arlington, N. J.* Lucite plastic used in "Mekanix-Lite" permits spotlighting of hard-to-see places. Adapters, in several shapes, one of which has a permanent magnet at the outer end with capacity to lift ¾ oz., thread into the end of an ordinary battery-operated flashlight. Vol. 84, p. 1107.

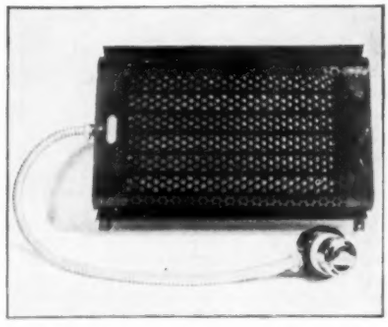
FLUORESCENT LAMPS — *Lamp Dept., General Electric Co., Nela Park, Cleveland, Ohio.* A 100-watt 60-in. lamp, a 6-watt 9-in. lamp, and a Soft-White lamp in several sizes and lengths have been added to the line of fluorescent lamps. Vol. 84, p. 1100.



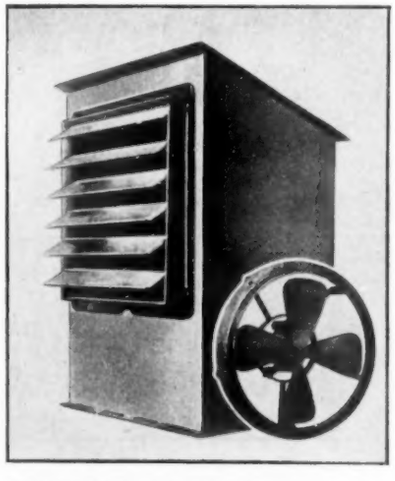
LOUVERS—*Benjamin Electric Mfg. Co., Des Plaines, Ill.* Better control of glare from fluorescent fixtures is achieved by lamp-shielding louvers made available for "Stream-liter" units. They are of steel, finished with a high reflection factor white enamel. Vol. 84, p. 948.

FLUORESCENT FIXTURE — *Hygrade Sylvania Corp., Salem, Mass.* "Miralume" F-230 lighting fixture incorporates two 100-watt fluorescent lamps. Vol. 84, p. 1050.

FLUORESCENT LAMP — *Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa.* Type FPR open-end twin-lamp fluorescent luminaire (not shown) utilizing 40-watt, 48-in. Mazda Type F white or daylight lamps, has been designed for general or supplementary lighting of low bay industrial areas. Unit is available in spread distribution style for operation on 110–125, 199–216, and 220–250 volts, 60 cycles a.c. Vol. 84, p. 643.

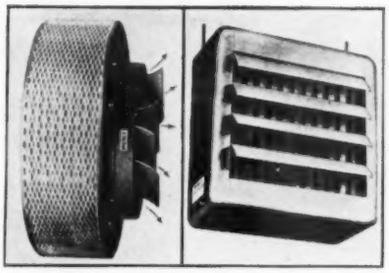


ELECTRIC HEATER—*Westinghouse Electric & Mfg. Co., Mansfield, Ohio.* Wall and floor mounted air heaters, are suitable for crane cabs, truck houses, valve houses, locomotive cabs, scale rooms, etc. They range from 1,000 to 4,500 watts. Vol. 84, p. 228.

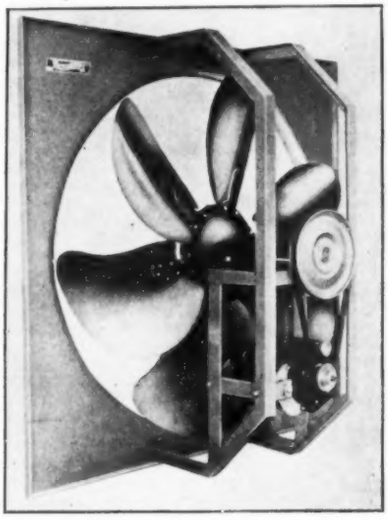


PENTHOUSE FANS—*Truflo Fan Co., 557 Main St., Harmony, Pa.* Penthouse fans vent obnoxious gases, fumes and dusts. Penthouses are available in sizes for housing standard Truflo wall fans 12 to 48 in. diameter. Vol. 84, p. 948.

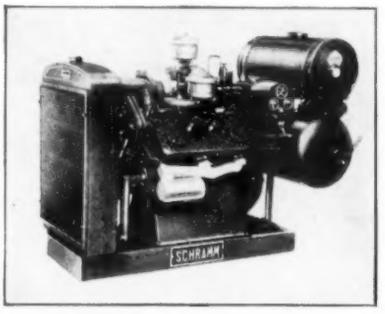
Fans, Heaters—PLANT SERVICE EQUIPMENT



UNIT HEATERS—*D. J. Murray Mfg. Co., Wausau, Wis.* M Series "Murco" unit heaters are made in both standard and vertical projection types. They are made in 27 models for steam, and 8 models for hot water. Vol. 84, p. 1108.

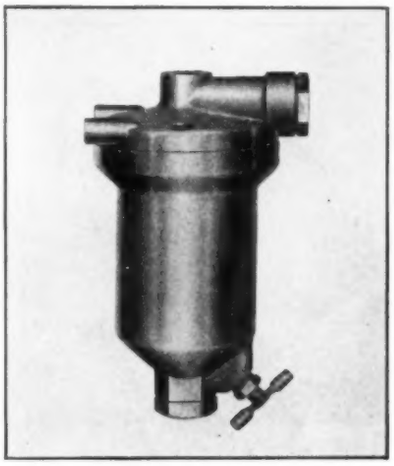


EXHAUST FAN—*Chelsea Fan & Blower Co. 370 W. 15th St., New York, N. Y.* Type IND belt-drive exhaust fan can be installed either in a wall or in a compact penthouse. A protruding orifice permits greater air delivery, while a heavy-duty die-stamped blade assures precision balance. Capacities range from 7,000 to 30,000 cu.ft. per min. Vol. 84, p. 897.

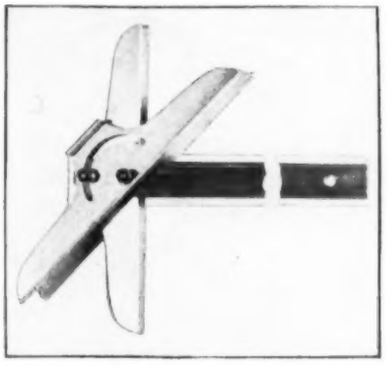


AIR COMPRESSOR—*Schramm, Inc., West Chester, Pa.* Replacing Model No. 55, Model No. 60 "Fordair" air compressor delivers about 8 per cent more air without any increase in dimensions or weight. Available in stationary mountings, the engine and compressor are built into one V-block for compactness and better performance. Units are complete with a built-in cooling system, water pumps being supplied to insure positive temperature control. They have complete electric starting systems. Vol. 84, p. 782.

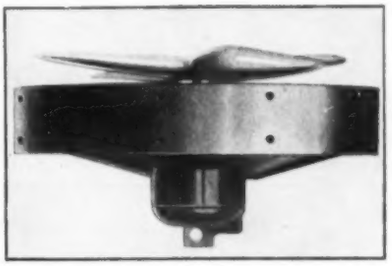
MOISTURE ELIMINATOR — *Logan Engineering Co., 4912 Lawrence Ave., Chicago, Ill.* "Aridifiers" remove moisture and oil from air and gas lines. Units are made in sizes from ⅜ to 10 in. They are especially recommended for application to air lines. Vol. 84, p. 114.



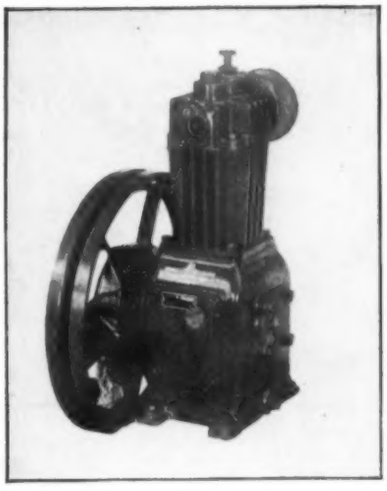
AIR LINE DRAIN—*DeVilbiss Co., Toledo, Ohio.* Type HOD automatic water drain for compressed air lines is claimed to be simple in construction, positive in action, and trouble-free in operation. Unit operates automatically by slight fluctuation of main line air pressure. Vol. 84, p. 1108.



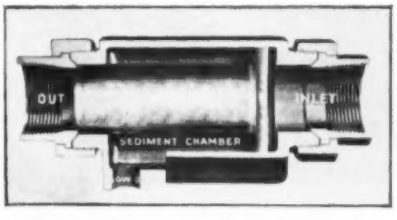
T-SQUARE—*Turner Devices, Inc., 1212 Mississippi Ave., St. Louis, Mo.* Transparent edges and pivoted "Alumilite" metal heads are outstanding features of the No. 30 stainless steel T-square. Double channel construction insures rigidity. Narrow blade covers a minimum of drawing, and transparent edges are secured by dovetails instead of cement. Vol. 84, p. 782.



ROOF FANS—*Truflo Fan Co., 557 Main St., Harmony, Pa.* These roof ventilating fans increase air removal in gravity type ventilators. They are available in 18, 24, 30, 36, 42 and 48 in. sizes, with capacities ranging from 2,000 to 40,000 cu.ft. per min. Vol. 84, p. 600.



AIR COMPRESSOR—*Sullivan Machinery Co., Michigan City, Ind.* Type Q air compressors are air cooled, single and two-stage and range in capacity from 2.8 to 4.57 cu.ft. per min. with pressures of 100 to 200 lb. per sq.in. under continuous loads. Pressures under intermittent loads are 150 to 500 lb. per sq.in. Motor sizes range from ½ to 10 hp. Vol. 84, p. 555.

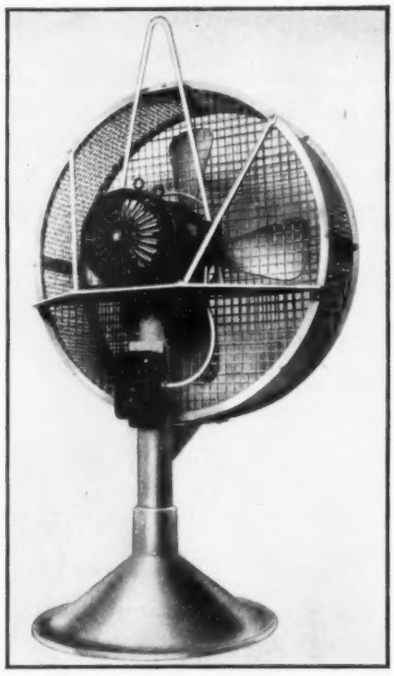


STRAINERS—*Wright Austin Co., 315 W. Woodbridge St., Detroit, Mich.* Made in six sizes, for ½ to 2 in. pipe, "Easy-clean" strainer is suitable for steam, air, gas, oil or water lines. A dirt pocket in the bottom collects dirt and scale before reaching the screen, made of perforated sheet brass and having 400 $\frac{1}{32}$ in. holes per sq.in. Cast semi-steel body is suitable for pressures up to 250 lb. Vol. 84, p. 439.

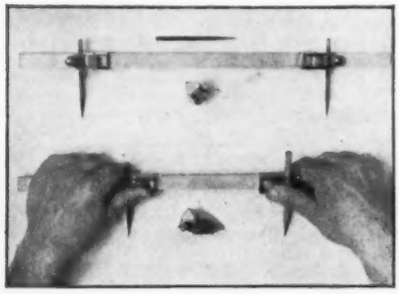
AIR FILTER—*Staynew Filter Corp., 25 Leighton Ave., Rochester, N. Y.* Model AAPHS "Protectomotor" air filter (not shown) removes oil from compressed air lines. It also prevents passage of moisture, dust, dirt, pipe scale and other foreign matter. It is especially suited for cleaning air used in pneumatic control instruments. Vol. 84, p. 315.

PLANT SERVICE EQUIPMENT—Drafting Units

FLOAT TRAP—*Wright-Austin Co., 315 W. Woodbridge St., Detroit, Mich.* Developed for draining moisture and oil from all kinds of compressed air equipment. No. 23-AC float trap (not shown) never needs priming by hand. It is made with three sizes of pipe connections: ¾, 1 and 1¼ in. Vol. 84, p. 315.

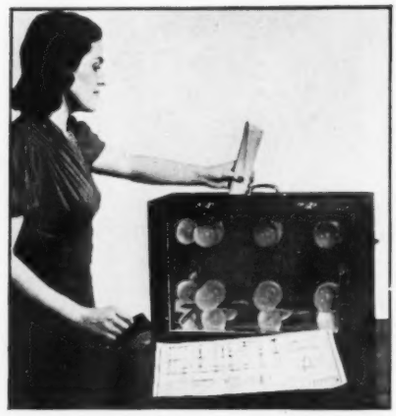


COOLING FANS—*Truflo Fan Co., 557 Main St., Harmony, Pa.* A series of portable man cooling fans, available in sizes from 12 to 36 in. diameter, is available. Illustrated is a 36-in. unit which is 48 in. high to the center line of the fan wheel with a 32-in. diameter cast iron base. A 3-hp. motor is used. Total weight is 356 lb. Vol. 84, p. 398.



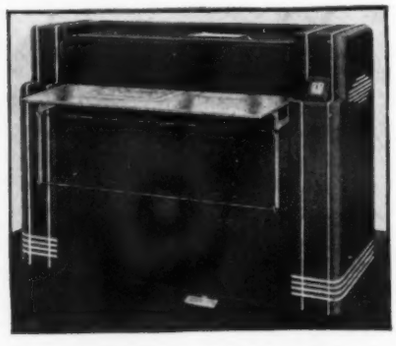
TRAMMEL—*Reinhold Paege, 14872 Ilene Ave., Detroit, Mich.* This trammel consists of a 30-in. wooden beam of special cross section, two brass bodies with holes in the corners for steel points, and knurled brass rollers held against the trammel beam with steel springs. It can be used for inside or outside calipers simply by changing points. Vol. 84, p. 400.

GRAPH PAPER—*Eugene Dietzgen Co., 2425 Sheffield Ave., Chicago, Ill.* These graph papers include "same division" and "different division" sheets, with a wide range of divisions; logarithmic and semi-logarithmic sheets in varying divisions, sizes and weights; mathematical sheets in circular percentage, isometric, polar and triangular coordinates; and time element sheets for periods from one day to five years. (Not shown.) Vol. 84, p. 38.

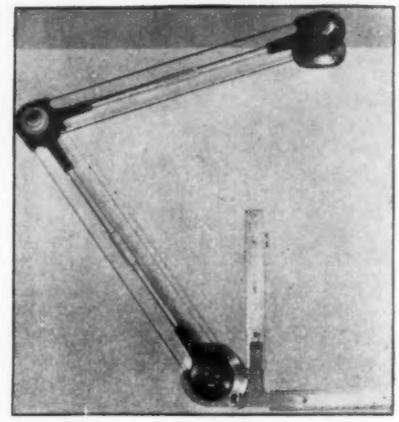


PORTABLE PRINTER—*Ozalid Corp., Ansco Rd., Johnson City, N. Y.* "Elpro" portable printer uses positive printing, dry developing, Ozalid sensitized papers and cloths. It will reproduce drawings, letters, reports, maps and other items having pencil or ink lines, typewritten or printed matter, appearing on one side of a reasonably translucent sheet. Vol. 84, p. 400.

WHITEPRINTER—*Ozalid Corp., 354 Fourth Ave., New York, N. Y.* Improved Model A automatic high-speed whiteprint machine employs a quartz-envelope high-pressure mercury vapor lamp for faster printing speed, ranging up to 20 ft. per min. Printer is available for prints up to 42 and 54 in. widths. Vol. 84, p. 263.



BLUEPRINTER — *Charles Bruning Co., 100 Reade St., New York, N. Y.* Embodying as a major improvement a high-pressure mercury quartz lamp, this improved blueprinting machine makes prints at 20 ft. per min. from new pencil and ink tracings using medium speed paper. Vol. 84, p. 36.



DRAFTING MACHINE—*V. & E. Engineering Co., 758 S. Fair Oaks, Pasadena, Calif.* An outstanding feature of "Veeco" drafting machine is its combination indexing. Manually controlled indexing for infrequent changes in angular position is operated by a thumb-piece conveniently located in the handle. For automatic indexing, protractor arm can be set and automatically held at any predetermined angle. Vol. 84, p. 948.

SENSITIZED LINEN—*Hunter Electro-Copyist, Inc., Syracuse, N. Y.* "Heccotex" sensitized linen (not shown) will reproduce a master positive copy from a pencil drawing for use in every respect like a tracing. Copy is made by contact photoprinting in ordinary office light, with complete elimination of ink tracing by hand. Vol. 84, p. 560.

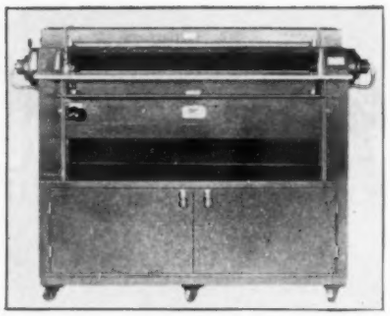
TRANSPARENT MEDIUM—*Frederick Post Co., P. O. Box 803, Chicago, Ill.* Ink-like opacity from hard drawing pencils is claimed for "P.T.M." transparent medium (not shown) that is not a tracing cloth and not a vellum. Standard rolls are 20 yd. long, and 30, 36, 42 or 54 in. wide. Vol. 84, p. 559.

PEN FILLER—*Eugene Deitzgen Co., 2425 Sheffield Ave., Chicago, Ill.* "Handy" pen-filling inkstand consists of a stand which holds a regulation ¾ oz. bottle of ink; a dipper arm which closes the bottle tightly, and a finger-touch lever which raises a filling loop. Vol. 84, p. 186.

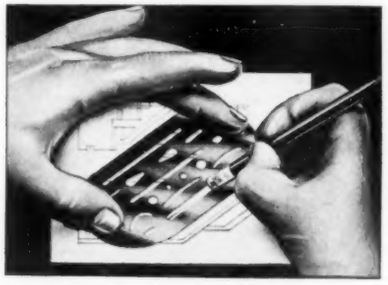
DRAWING MEDIUM—*Frederick Post Co., P. O. Box 803, Chicago, Ill.* Ink-like opacity from hard drawing pencils is provided by "P.T.M." transparent medium (not shown). Advantages include exceptional strength and body. Standard rolls are 20 yards long and 30, 36, 42 or 54 in. wide. Vol. 84, p. 739.

CLAMP TEMPLETS—*Detroit Stamping Co., 343 Midland Ave., Detroit, Mich.* Sets of templets (not shown) are scaled precisely to new toggle clamp dimensions. Eighteen separate templets are provided, ranging from light up to air operated heavy duty models. Each is reproduced on hard finish parchment paper. Vol. 84, p. 1108.

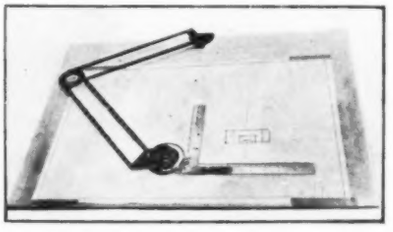
Safety Devices—PLANT SERVICE EQUIPMENT



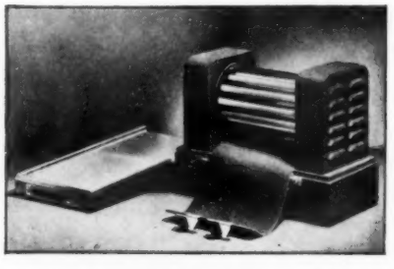
WHITEPRINTER — *Ozalid Corp., Johnson City, N. Y.* Model F fast-printing whiteprint machine combines printer and dry-developer in one compact light-weight unit. High-pressure mercury vapor lamp gives speeds up to 56 in. per min. Vol. 84, p. 643.



ERASER SHIELD—*Eugene Dietzgen Co., 2425 Sheffield Ave., Chicago, Ill.* This "Non-Skid" erasing shield has cupped openings for finger and thumb. It measures 2⅝ x 4⅜ in. and has fourteen openings. Vol. 84, p. 76.

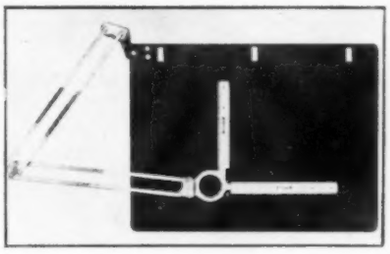


DRAFTER—*L. G. Wright, Inc., 5209-¼ Euclid Ave., Cleveland, Ohio.* "Wrigraph Industro" completely adjustable ball-bearing drafting machine for drawings up to 24 x 36 in. can be clamped to any drawing board up to two inches thick and 36 in. wide. Four models are available. Vol. 84, p. 596.



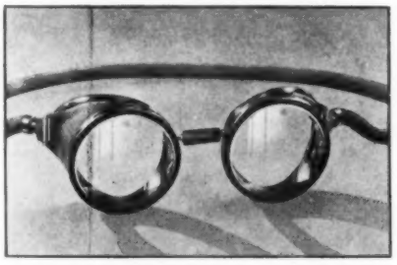
PRINTER—*A. B. Dick Co., Chicago, Ill.* "Mimeograph" photochemical printer reproduces any opaque drawing on translucent cloth accurately. Time from tracing to finished copies is less than 25 min. Vol. 84, p. 150.

EYESHIELD — *Jackson Electrode Holder Co., Detroit, Mich.* This eyeshield is characterized by lightness, comfort and wide vision. It is recommended for buffing, polishing, light grinding, spot, flash and gun welding machines. Lenses are of flexible, shatter-proof Plastacele. Vol. 84, p. 267.



DRAWING MACHINES—*Drafto Co., Cochranton, Pa.* Two series of portable drawing machines include seven models. Vol. 84, p. 642.

SAFETY SHOES—*F. J. Stahmer Shoe Co., Davenport, Iowa.* This improved Davenport wood-sole safety shoe has correct rock from heel to toe for greater ease of walking. Thickness of sole at ball of foot is 1 in. Heel thickness is 1¾ in. Composition toe resists 600-lb. pressure. Steel toe resists 4,000-lb. pressure. Vol. 84, p. 1046.



SAFETY GOGGLES—*American Optical Co., Southbridge, Mass.* No. 303 "Super Duralite—50" safety goggle has a non-rubber headband. Eyecups are molded from a material which combines light weight with high tensile strength. It is not affected by exposure to water, oil, grease or perspiration, and can be sterilized by any method without harm. Vol. 84, p. 74.

FACE SHIELDS—*Mine Safety Appliances Co., Braddock, Thomas & Meade Sts., Pittsburgh, Pa.* Intended for jobs where goggles are not absolutely required, yet where face protection is desirable, these face shields protect against hot sparks, chemical splashes, flying grit and dust. They are available without sparkshield, with semi-sparkshield, and with full sparkshield. Vol. 84, p. 74.

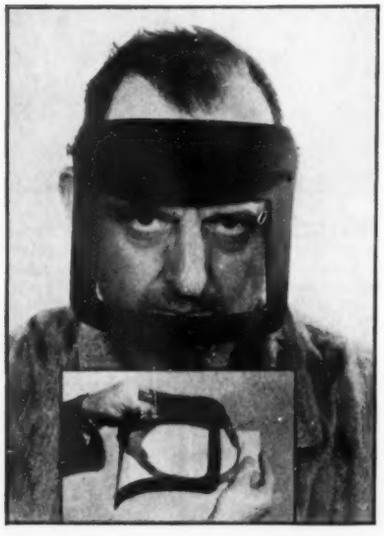
GOGGLE SHIELD—*Kimball Safety Products Co., 7314 Wade Park Ave., Cleveland, Ohio.* Cellulose acetate side shield for spectacle-type protective goggles provides added protection against particles getting into the eye from the side. Vol. 84, p. 1106.

RESPIRATOR—*Mine Safety Appliances Co., Braddock, Thomas & Meade Sts., Pittsburgh, Pa.* For protection against fumes of metals, such as those generated when burning, pouring or molding lead, cadmium, zinc, etc., "Comfo" respirator permits use of goggles or other headgear without interference. Vol. 84, p. 1000.

PLANT SERVICE EQUIPMENT—Safety Devices

DRUM TIPPER—*Lewis-Shepard Sales Corp., 245 Walnut St., Watertown, Mass.* This tipper consists of a handle with a pronged adjustable collar, which allows the tipper to fit all types of drums and large or small-bilged barrels. Vol. 84, p. 1046.

WELDERS' GOGGLES — *American Optical Co., Southbridge, Mass.* No. 323 "Duralite Coverglas" goggles (not shown) provide protection for gas welders who must wear glasses. It fits snugly over any style of spectacle and protects from flying sparks and scale, injurious rays and glare. It is fitted with "Noviweld" lenses. Vol. 84, p. 404.



FACE SHIELD—*Boyer-Campbell Co., 6540 Antoine St., Detroit, Mich.* Equipped with a Plastacele window that slides in and out of a fiber frame. this face shield is recommended for spot, flash and gun welding. buffing, polishing, wire brushing, and similar operations. Vol. 84, p. 444.

SHOE INSERT—*Mine Safety Appliances Co., Thomas, Braddock & Meade Sts., Pittsburgh, Pa.* Protection against nails, spikes, and other underfoot hazards is provided by the "Safety Insole," built of two layers of overlapping steel strips molded in rubberized fabric. Vol. 84, p. 116.

FILTER CARTRIDGE — *American Optical Co., Southbridge, Mass.* This filter cartridge (not shown) for R-1000 respirator gives protection against toxic dusts formed by crushing, grinding and abrading such solids as lead, cadmium, arsenic, chromium, manganese, selenium, vanadium and their compounds. Vol. 84, p. 738.

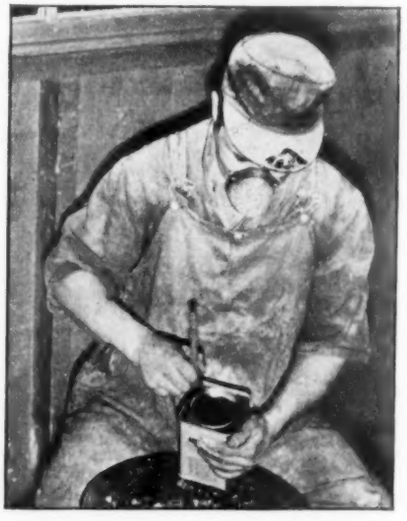
PROTECTIVE CLOTHING — *United States Rubber Co., 1230 Sixth Ave., New York, N. Y.* Synthetic rubber clothing (not shown) made of "Synthal" resists oil, grease, acid, alkali, and similar chemicals. All seams are vulcanized. Vol. 84, p. 902.

RESPIRATOR—*H. S. Cover, South Bend, Ind.* "Dupor" No. 1 respirator is so small that it can be carried in the vest pocket. It weighs only 1 oz. Filter is folded so that 9 sq.in. of filtration area is provided. Vol. 84, p. 598.

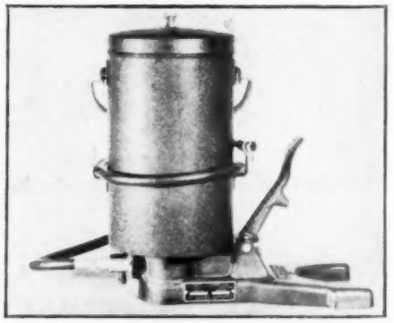
WELDING GLOVES—*American Optical Co., Southbridge, Mass.* Two welding gloves (not shown) insulated for heat protection and reinforced for long life, have been made available. TX100 glove has no seams exposed to active wear. Other glove, of slightly different design, is made on the "gun-cut" pattern from chrome tanned horsehide, with a seamless palm. All seams of this No. 3015 glove are at the back of the fingers, where they are not exposed to wear, except for welt-reinforced seams at bases of second and third fingers. Vol. 84, p. 739.

GRINDER SHIELD—*Boyer-Campbell Co., 6540 Antoine St., Detroit, Mich.* "Marvel" grinder shield has a molded plastic frame and non-shatterable glass. Lamps are vibration resisting, set flush with frame. Vol. 84, p. 74.

SWEAT BANDS—*Jackson Electrode Holder Co., 6553 Woodward Ave., Detroit, Mich.* Two sweat bands made of fine-pore cellulose sponge stitched to a fabricoid band with an inner lining of cork are available. No. 15, illustrated, is a general purpose band. No. 5 is intended for use with Jackson eyeshields. Vol. 84, p. 690.

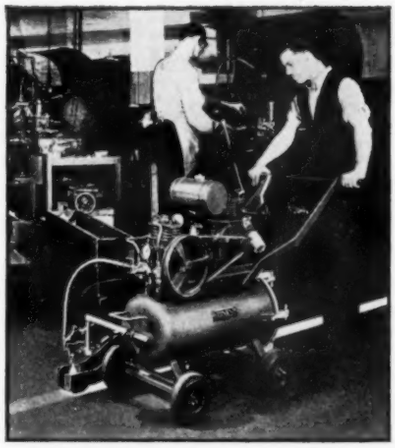


RESPIRATOR—*American Optical Co., Southbridge, Mass.* This 1½-oz. respirator protects against dust, pollen and bacteria. Featured are a new filter unit, improved exhalation valve and self-equalizing double headband. Vol. 84, p. 396.



ALEMITE GUN—*Alemite Div., Stewart-Warner Corp., 1826 Diversey Parkway, Chicago, Ill.* Especially adaptable for lubricating industrial equipment, Model 6697-A low-pressure volume delivery foot gun has a capacity of 25 lb., and pumps approximately 1 cu.in. of grease per stroke. Maximum pressure when operated by hand is 3,000 lb., and when operated by foot 5,000 lb. Vol. 84, p. 598.

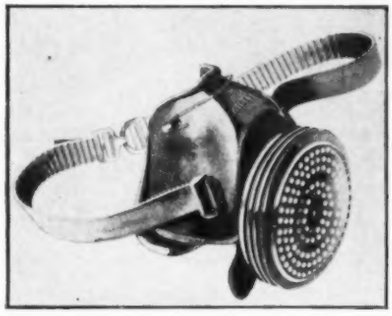
Maintenance—PLANT SERVICE EQUIPMENT



SPRAY LINE MARKER—*Binks Mfg. Co., 3114–26 Carroll Ave., Chicago, Ill.* No. 240 spray line marker is a self-contained portable unit for marking traffic lines. It will stripe from 2 to 6 in. wide at 1 to 4 m.p.h. Vol. 84, p. 398.

PROTECTIVE CREAM—*Milburn Co., 905 Henry St., Detroit, Mich.* Protection to welders and cutters, especially when large diameter rods are being used, with resultant flashes, is given by "Ply" No. 8 vanishing cream (not shown). Vol. 84, p. 643.

SKIN OINTMENTS — *Milburn Co., 905 Henry St., Detroit, Mich.* A series of creams and ointments (not shown) provide skin protection. They consist of ingredients insoluble in the specific chemicals to be combated. "Ply" Nos. 1 and 2 are applied like vanishing cream, while "Ply" No. 6 is of the ointment variety. No. 1 protects against oil, paint, asphalt, tar, grease, wax and pitch. Protection against petroleum products, cooling lubricants and cutting compounds is furnished by No. 2. No. 6 protects against acids. Vol. 84, p. 600.

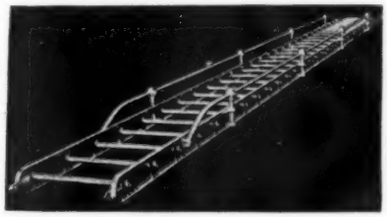


RESPIRATOR — *Willson Products, Inc., 251 Thorn St., Reading, Pa.* Claimed to be the lightest throw-away filter-type respirator yet to receive the U. S. Bureau of Mines approval, "Bantam" respirator can be worn for long periods without discomfort. Vol. 84, p. 950.

CENTER POINT LUBE—*Chicago Mfg. & Distributing Co., 1936 W. 46th St., Chicago, Ill.* With this improved lathe center point lube (not shown) having the consistency of No. 2 grease, only one application is required for any job being turned. It is not necessary to use high-speed steel lathe centers. Vol. 84, p. 902.

LADDER—*Aluminum Ladder Co., 104 Adams St., Tarentum, Pa.* A straight aluminum ladder, weighing only 1 lb. per ft. but strong enough for all ordinary uses, permits easy portability and low cost. It is supplied in sizes up to 16 in. wide and 30 ft. long. Vol. 84, p. 1048.

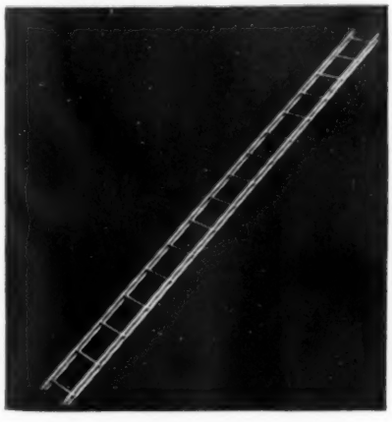
PIPE CLEANER—*Oster Mfg. Co., Cleveland, Ohio.* An electric sewer and pipe cleaning machine removes stoppages several hundred feet from the sewer or pipe opening, even when it is necessary to pass through elbows and traps. It is powered by a ½-hp. universal reversible variable-speed motor. Vol. 84, p. 850.



LADDER—*Aluminum Ladder Co., 104 Adams St., Tarentum, Pa.* Type 800 aluminum ladder is equipped with handrails on both sides and steel or aluminum spikes on the bottom. It can be supplied in lengths up to 36 ft. in various widths. Vol. 84, p. 230.

FIXTURE CLEANER — *Bradley Washfountain Co., N. 22nd & W. Michigan Sts., Milwaukee, Wis.* "Bradex" cleaning agent (not shown) can be used on all washroom facilities. Vol. 84, p. 1104.

LUBRICANT—*Pfaltz & Bauer, Inc., Empire State Bldg., New York, N. Y.* It is claimed that less viscous and generally cheaper oils can be used satisfactorily in combination with "Kollag" graphite lubricant (not shown). This colloidal graphite, suspended in a specially selected lubricating oil, is said to have a purity of 99.8 per cent. Vol. 84, p. 1000.



LADDER—*Aluminum Ladder Co., 104 Adams St., Tarentum, Pa.* Two double or A type ladders are constructed of a special aluminum alloy having a tensile strength of 48,000 lb. per sq.in. No. 900 is 36 in. high, has a platform measuring 12x15 in., and weighs only 13 lb. No. 901, constructed of treadplate for protection against slipping, is 48 in. above the floor and has a platform measuring 19½ x 22 in. Vol. 84, p. 688.

WATER COOLER—*General Electric Co., Bloomfield, N. J.* Type RM-05 high-capacity double-bubbler water cooler for use in heavy manufacturing plants is entirely self-contained in a sturdy, rust-resistant, all-steel welded cabinet. Large reserve capacity is provided by a 10-gal. stainless steel storage tank and by an oversized compressor motor. Vol. 84, p. 780.

WASHFOUNTAINS—*Bradley Washfountain Co., N. 22nd & W. Michigan Sts. Milwaukee, Wis.* Washfountains (not shown) are now made in clad stainless steel. Bowls have an 18-8 stainless steel surface approximately 0.028 in. thick bonded to a mild-steel base. Fixtures are available in circular and semi-circular models, 54 and 36 in. in diameter. Vol. 84, p. 802.

AIR HOSE—*B. F. Goodrich Co., Akron, Ohio.* Recommended for use where excessive hot oil conditions are encountered, Type 54 air hose (not shown) is made with a synthetic tube and rubber cover. Vol. 84, p. 789.

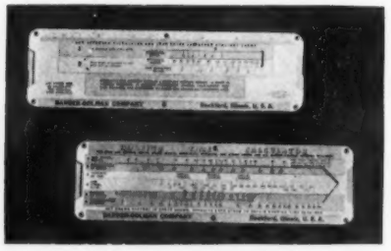
PLANT SERVICE EQUIPMENT—Miscellaneous

"FLANGE-JACKS"—*Garlock Packing Co., Palmyra, N. Y.* They are available in three sizes: for pipe sizes under 2 in., for flanges from 2 to 20 in.. and for flanges from 14 to 48 in. Vol. 84, p. 733.

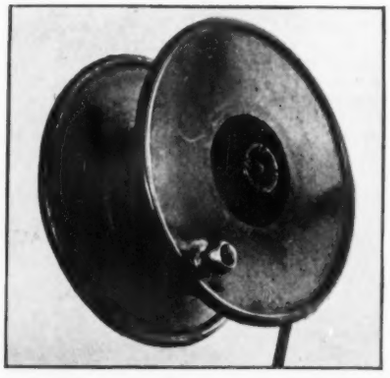
LEAK-STOPPER—*Flexrock Co., Dept. A. M., 2300 Manning St., Philadelphia, Pa.* "Flextite" leak stopper sets almost immediately. It is forced against water pressure, held there a few seconds, and the leak is stopped. Vol. 84, p. 738.

PORTABLE PUMP—*Blackhawk Mfg. Co., 5025 W. Rogers St., Milwaukee, Wis.* Model P-95 "Porto-Power" pump for supplying 10,000 lb. per sq.in. pressure to "Porto-Power" hydraulic rams weighs only 32 lb. and is powered with a built-in ½-hp. motor. Vol. 84, p. 688.

STOOL—*Dependable Mfg. Co.. 122 N. 11th St., Omaha, Nebr.* No tools are required to change position of the automatically adjustable "Vitek" stool (not shown). **Vol. 84, p. 1048.**

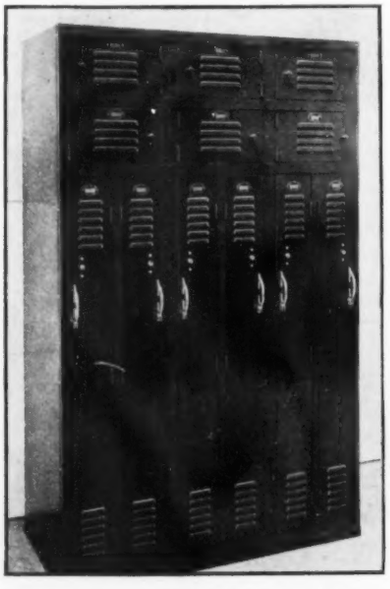


HOBBING CALCULATOR—*Barber-Colman Co., Rockford, Ill.* A slide rule permits calculation of hobbing time for spur gears, spline shafts and other straight forms. Time is easily calculated by setting the two slides on the reverse side in the order indicated. Vol. 84, p. 895.

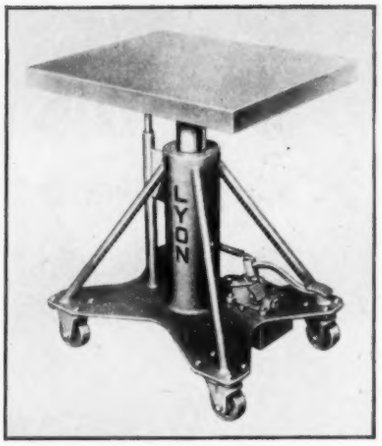


HOSE REEL—*Schramm, Inc., West Chester, Pa.* A live hose reel, for use with either water or compressed air, is available in either wall or tank mounting types. Three ft. or the entire 50 ft. of hose can be unreeled and the valve opened. Vol. 84, p. 900.

FILTER PAPERS—*Enthone Co., 442 Elm St., New Haven, Conn.* Paper (not shown) for filter presses is claimed to have high wet strength. Vol. 84, p. 77.

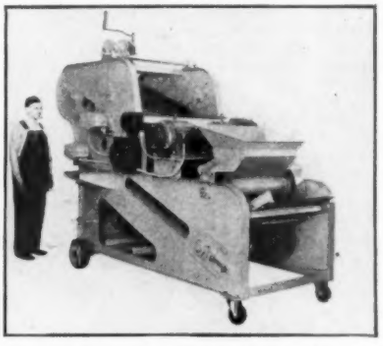


LOCKERS—*Penn Metal Corp. of Pennsylvania, 36 Oregon Ave., Philadelphia, Pa.* Two-in-one steel lockers have been designed especially for use in cramped quarters. Each locker is 15 in. wide, 21 in. deep and 73½ in. high, and is divided into two coat compartments. Vol. 84, p. 736.

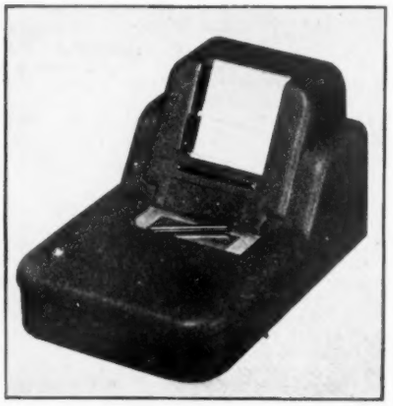


ELEVATING TABLE—*Lyon Iron Works, 587 Madison St., Greene, N. Y.* Short, easy strokes on a pedal operate this hydraulic elevating table, which measures 24 x 30 in. Lowered height is 28 in.; elevated height is 42 in. Capacity is 2,000 lb. Vol. 84, p. 1106.

LUBRICATING COATING—*Acheson Colloids Corp., Port Huron, Mich.* A stable, highly adherent coating (not shown) for prelubricating surfaces not readily capable of lubrication by ordinary means is applied in liquid form, either by dipping, brushing or spraying, and hardens on exposure to light. It also provides relatively high resistance to abrasion. Coatings may be applied at normal temperatures or on surfaces heated to 100 C. Vol. 84, p. 51.



MAGNETIC SEPARATOR—*Stearns Magnetic Co., Milwaukee, Wis.* A double magnetic pulley separator is designed to separate brass and iron turnings and borings. Top unit consists of a 15-in. diameter magnetic pulley, 30 in. wide, and the lower unit has a 12-in. by 30 in. magnetic pulley. Vol. 84, p. 556.

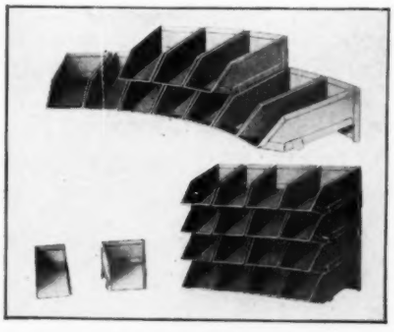


"TELESCRIBER" — *TelAutograph Corp., 16 W. 61st St., New York, N. Y.* An improved "Telescriber" transmits writing, sketches or designs in facsimile to a number of stations simultaneously or to any one or more stations selectively. Machine measures only 12½ in. wide, 18¾ in. deep and 10⅝ in. high. Vol. 84, p. 898.

Miscellaneous—PLANT SERVICE EQUIPMENT

ELECTRIC GLUE POT—*Westinghouse Electric & Mfg. Co., Mansfield, Ohio.* An automatic, dry-type electric glue pot featuring a snap-action thermostat which maintains a temperature of between 150 and 160 F., requires only 30 to 50 min. to heat a full 2-qt. container to 150 F. It draws 250 watts at 115 or 230 volts. Vol. 84, p. 267.

SOUND METER—*General Electric Co., Schenectady, N. Y.* This portable sound-level meter weighs only 19 lb. but has a range of 24 to 120 decibels. Complete instrument, including microphone, mounting arm, calibrating unit and batteries, is contained in a 12¾ x 7¾ x 9¼ in. case. Vol. 84, p. 942.

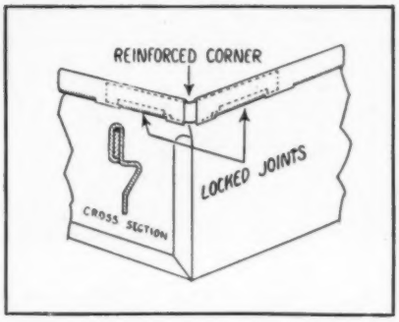


ASSEMBLY TRAYS—*Stackbin Corp., 42 Troy St., Providence, R. I.* This large assembly bin is 12 in. long, 4 in. deep, 5 in. wide at the front and 6 in. wide at the back. Contents are fed toward front by a sloping floor. Vol. 84, p. 396.

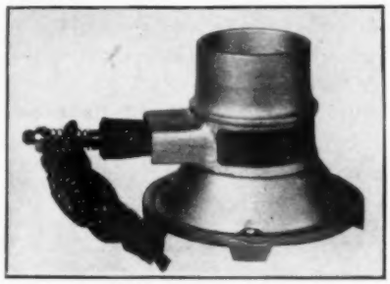
DIE LUBRICANT—*St. John X-Ray Service, Inc., 30-20 Thomson Ave., Long Island City, N. Y.* An improvement over "White Bonis," "Black Bonis" (not shown) is supplied in paste form, to be dissolved in water and applied under air pressure over hot dies and cores to protect tools and provide smooth surfaces on die castings. Vol. 84, p. 232.

WELDED BENCH—*Stackbin Corp., 42 Troy St., Providence, R. I.* All-welded steel construction gives this machinist's bench life-long rigidity without periodic tightening of bolts or rivets. Top is ⅛ in. thick, shelves are No. 14 gage, and legs are heavy angles. Model illustrated has a 20 x 24-in. top and is 30 in. high. Vol. 84, p. 556.

"WIROMETER"—*General Electric Co., Bridgeport, Conn.* "Wirometer" pocket-size wire calculator, for computing wiring problems in accordance with the 1940 National Electrical Code, measures 8 in. long and 2⅜ in. wide. It is made up of two sliding celluloid covers and six interchangeable cardboard slides. Vol. 84, p. 950.

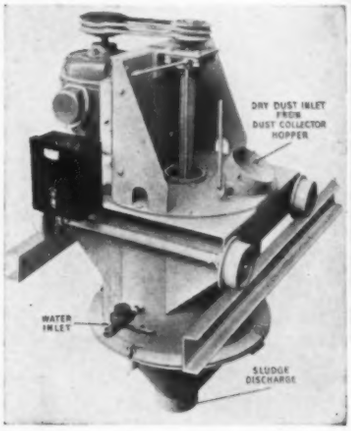


STACKING BOX—*Pollard Bros. Mfg. Co., 5503 Northwest Highway, Chicago, Ill.* Improved reinforced corners are incorporated in five standard sizes of stacking boxes and open-end boxes. Vol. 84, p. 149.

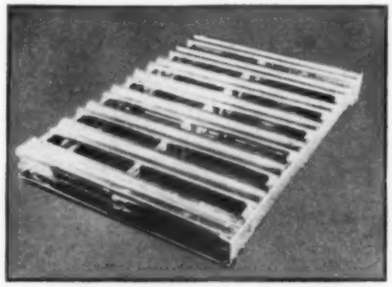


SOLDER POTS—*Electric Soldering Iron Co., Deep River, Conn.* "Esico" solder pots are suitable for production jobs where fast dipping of parts is required. They are available for 115 and 230 volts, in wattages from 200 to 450. Capacities range from ¾ to 6¼ lb. Vol. 84, p. 846.

DUST COLLECTOR—*American Foundry Equipment Co., 580 S. Byrkit St., Mishawaka, Ind.* "Cyclone" dust collector provides high efficiency in separating dust from air stream by centrifugal force. Vol. 84, p. 804.



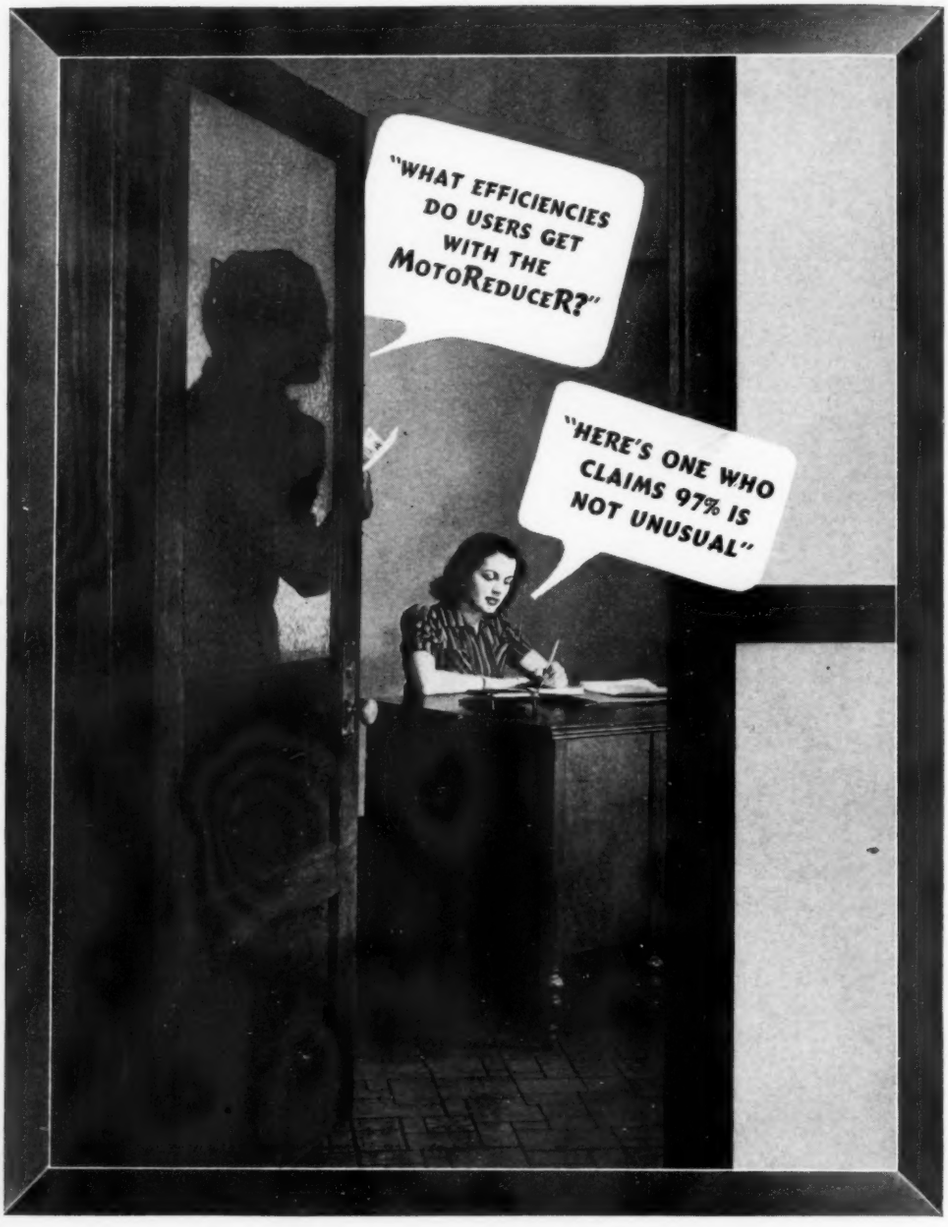
DISPOSAL UNIT—*American Foundry Equipment Co., 581 S. Byrkit St., Mishawaka, Ind.* This disposal unit wets and mixes with water collected dust discharged from dry types of dust collectors. Vol. 84, p. 802.



STEEL PALLETS—*Palmer-Shile Co., 7100 W. Jefferson Ave., Detroit, Mich.* This sectional-face all-steel pallet has a solid face of corrugated center rib. Formed sections allow use of lighter gage material. Vol. 84, p. 600.

TOUR SYSTEM—*Dudley Lock Corp., 325 N. Wells St., Chicago, Ill.* This watchman's tour system can flash or permanently record the time of inspection and summon aid in emergencies. Vol. 84, p. 688.

Philadelphia
LIMITORQUE
CONTROL
operates all types of valves, etc., safely, economically, from convenient stations.
Philadelphia
WORM GEAR
SPEED REDUCER
right angle drives—vertical or horizontal. Wide range of ratios and horsepowers.
Philadelphia
HERRINGBONE
SPEED REDUCER
for heavy loads at high speed. Single, Double, Triple Reduction; various ratios and horsepowers
Philadelphia
MotoReducer
The economical self-contained drive. Horizontal or Vertical types—various ratios and horsepowers.
Philadelphia GEARS
All types and sizes of industrial gears. Can be supplied in all materials.



Through elimination of baseplates and couplings between motor and reducer, the Philadelphia MotoReduceR is economical to install in all types of industrial plants.

Its very high efficiency in operation brings further economies to industrial production—and records for trouble-free service have saved on maintenance and continuous production problems.

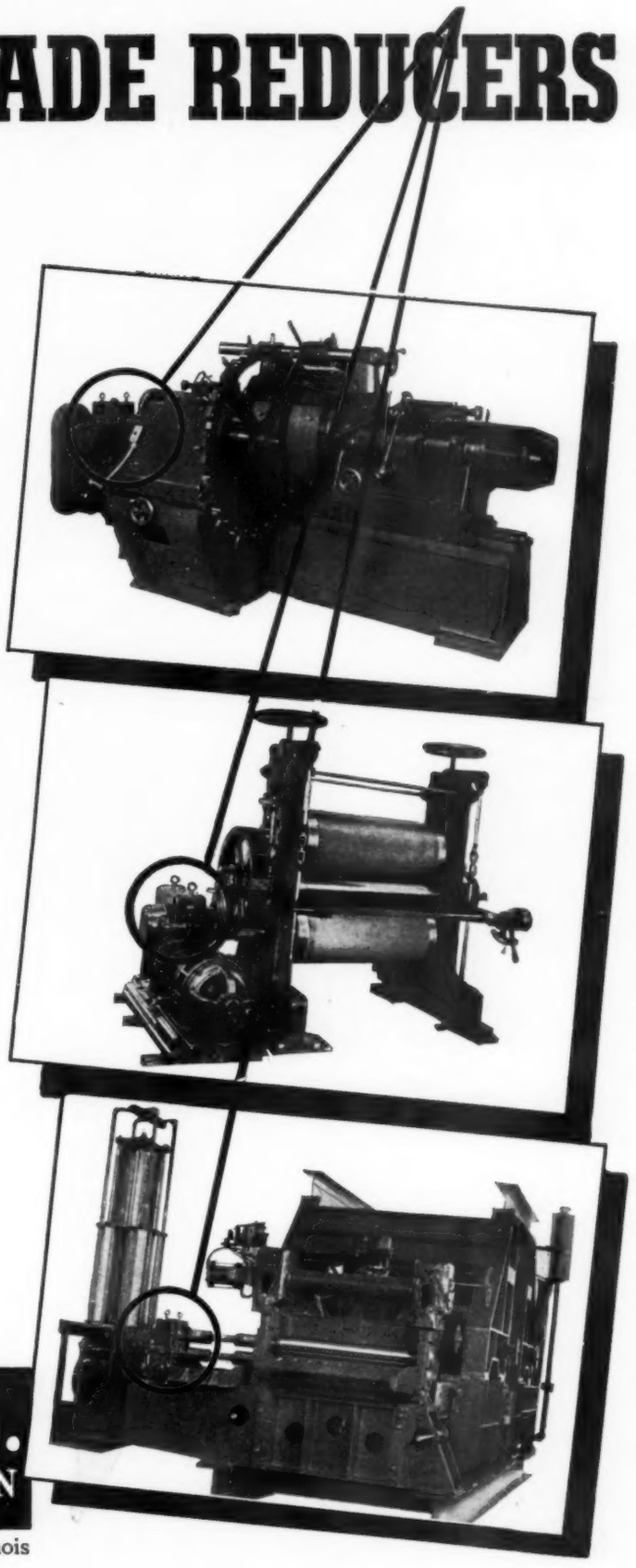
These combined savings invite your inquiries for either horizontal or vertical drives . . . in a wide range of ratios and horsepowers.

Write for full engineering data and recommendations. Also, ask about the PlaneTorque MotoReduceR. It provides sure protection to itself and driven equipment, wherever overloading or jamming may occur.

PHILADELPHIA GEAR WORKS

Industrial Gears and Speed Reducers
Erie Ave. and G St.
Philadelphia, Pa.
•
New York • Pittsburgh • Chicago

For STAMINA! use IXL HYGRADE REDUCERS



FOR DRIVING MACHINES to meet grueling production schedules, machines to run three shifts day in and day out, you need gears and reducers with the stamina to stand the gaff. IXL Hygrade Speed Reducers solve the problem of those jobs. You can specify them with confidence that they're designed and built to meet the toughest demands. They're produced by an organization with 80 years experience and thousands of outstandingly successful installations behind it. No matter what kind of a reducer or gear your problem demands, you can count on getting an IXL product, standard or special, to solve your problem. Tell us what you need—today.

•

P. S. If you don't have the 660 page IXL Handbook "Gear Problems" at your elbow, send for it now.

IXL

The Mark of Quality

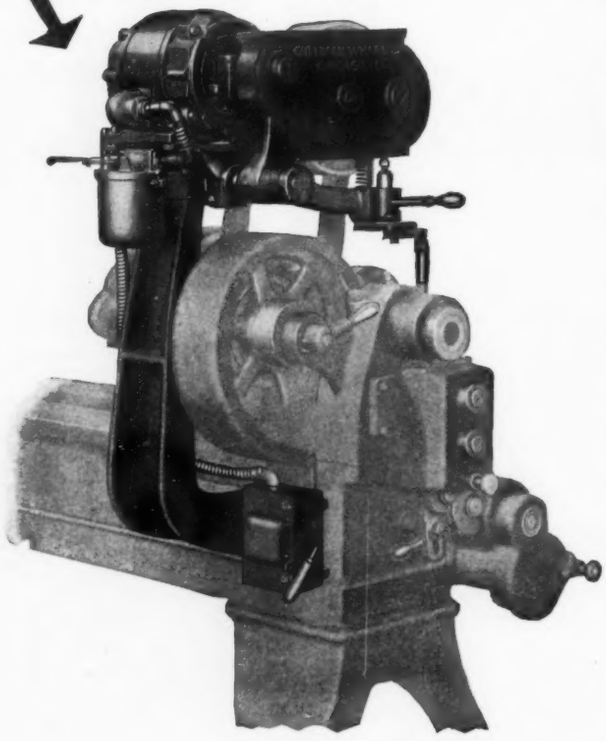
FOOTE BROS.

GEAR AND MACHINE CORPORATION

Established 1859

5301-MS Western Blvd. • Chicago, Illinois

MODERN DRIVE FOR MACHINE APPLICATION



CULLMAN
Motor Drive Unit

OPERATED WITH INSTANT, CONVENIENT CONTROL AND BELT DRIVE SMOOTHNESS

■ The Cullman Drive is an individual Electric Motor Unit designed to eliminate countershaft and overhead belting arrangements formerly used to drive Cone Pulley Machines.

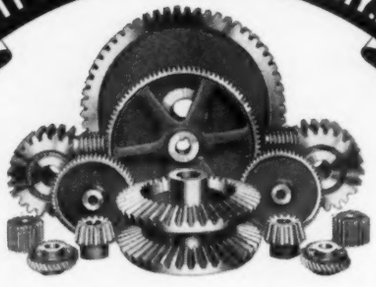
It increases machine efficiency 25%. Any lathe, shaper, milling machine, screw machine, or punch press can be modernized at surprisingly low cost by the installation of the Cullman Drive. It is simple in construction, efficient in operation and built for long service. Made in sizes for motors ranging from 1/4 to 15 H.P.

A 60-day FREE TRIAL, without obligation, will convince you of the value of Cullman Drives.

Write today for full information regarding this remarkable Motor Drive Unit now used by many leading companies.

CULLMAN WHEEL CO.
1349 ALTGELD STREET CHICAGO, ILL.

IT'S EASY TO SEE WHY...



YOU SHOULD *Specify* "CINCINNATI" GEARS

★ First . . . You want to buy gears from a manufacturer with a recognized reputation for high quality . . . service and at conservative prices. These facts are, we believe, a most important feature of any purchase.

★ A most modern plant, centrally located to facilitate speedy shipping . . . equipped to meet the most exacting demands . . . with hobs, tools and patterns in practically every standard size and shape, we have successfully served thousands of buyers for over 30 years.

★ ANY kind of gear . . . from any materials . . . from one to as many as you require . . . with precision controlled accuracy for continuous performance.

★ Is your gear problem different? Are you interested in an odd or special shape? The unusual has become routine here at Cincinnati Gear, and we will welcome an opportunity of working with you.

THE CINCINNATI GEAR COMPANY
"Gears . . . Good Gears Only"
1829 Reading Road ▪ Cincinnati, Ohio

Janette Speed Reducers

FOR SLOW SPEED DRIVES

This style of reducer can be furnished in speeds from about 135 to 1140 r.p.m., and is exceptionally easy to mount on machine tools.

We offer speed reducers in 19 styles, 43 sizes, 1/50 to 10 H. P., .08 to 1140 r.p.m., which makes these machines especially well adapted for driving machine tools.

Foot, single flange, double flange, and special mountings, such as the one illustrated, together with motors of standard and special types are available.

Janette speed reducers are reliable—thousands of these units are operated 24 hours each day on vital equipment in power plants.

WRITE FOR OUR 100 PAGE CATALOG

Janette Manufacturing Company
556-558 West Monroe Street Chicago, Ill. U.S.A.

GEARS . WORMS . CAMS . MADE TO ORDER

HARTFORD GEARS

THE HARTFORD SPECIAL MACHINERY CO., Hartford, Conn.

G E A R S

Spur - Helical - Bevel - Worms - Screws - Racks
Gear Hobbing - Thread Milling - Broaching

THE ADAMS COMPANY (*Est. 1883*) 1900 Bridge St. Dubuque, Iowa

QUALITY MACHINERY *demands*

Quality *Worms and Worm Gears*

. . . the kind you can get from

PERKINS

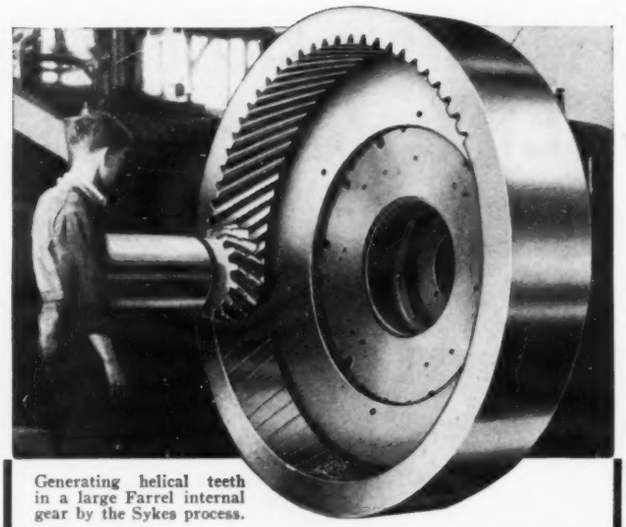
Nothing reflects quality of overall machine performance more than the quality of component parts on which operation depends.

High quality, precision worms and gears—the kind that Perkins makes—play an important part in achieving noiseless transmission and freedom from service costs. If you are interested in the kind of better performance which results from accuracy under all conditions, let Perkins help you toward these objectives and at the same time point out the economy and savings you can make through the use of Perkins hardened and ground worms and precision matched bronze worm gears.

Perkins Quality Worms and Worm Gears provide a means of insuring the reputation of your product for long life and accurate, trouble-free performance.
Let Perkins give you an estimate on your requirements.

PERKINS MACHINE & GEAR CO.

SPRINGFIELD, MASSACHUSETTS



Generating helical teeth in a large Farrel internal gear by the Sykes process.

FARREL INTERNAL GEARS

Accurately Generated

in Any Size up to 18 feet Diameter

Despite the recognized advantages of internal gears under certain conditions, designers were formerly deterred from using such gears in large sizes because of the difficulty of obtaining satisfactory large gears with generated internal teeth.

Farrel engineering has now eliminated this difficulty.

We design and build entirely satisfactory internal gears in any size up to 18 feet diameter, 12 inch face and 1¼ DP. These internal gears are accurately generated with either spur or helical teeth, by the famous Sykes process.

Farrel internal gears, both large and small, operate smoothly and quietly and render long service under the toughest conditions.

Our facilities for making both internal and external gears are exceptional. These facilities, together with the advice and experience of Farrel engineers, are at your service if you have a gear problem of any kind.

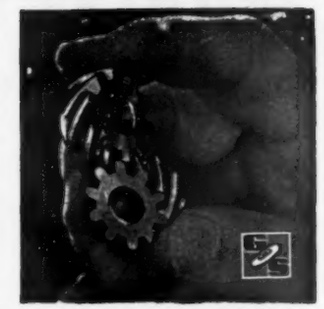
These splined parts for operating Boulder Dam butterfly valves illustrate the unique facilities of our gear plant. The large difference between the outside and spline diameters requires unusual equipment. Both internal and external splines are generated with short involute teeth, a very economical way of producing large splined shafts.

FARREL-BIRMINGHAM COMPANY, INC.

355 Vulcan St., Buffalo, N. Y.

SPIRAL GEARING

— in the finer pitches 14 to 96 D. P.



Also SPURS—BEVELS—WORM GEARING

Your small Gear needs may be few or many—experimental or production—'fussy' or 'commercial' — intricate or simple — Whatever they are, consult SPECIALISTS such as—

Made to order only *No stock* *No catalog*

Gear Specialties

INCORPORATED

CHICAGO

600 W. MEDILL AV. Phone, Humboldt 3482

- - - a "DEGREE" in gear perfection

"Gears by Meisel" . . . These two letters signify thirty-three years of specialization in the art of gear design. They symbolize the *construction of gears for specific purposes* which, by their inherent accuracy, assure the highest possible degree of mechanical perfection. Lay your problem before a MEISEL Gearist to determine the *one* gear suited for your job.

An interesting brochure, entitled "Gear Craftsmanship," will be mailed FREE upon request.

MEISEL PRESS MFG. CO.

946 Dorchester Avenue, Boston, Mass.

BRAWNY GEARS

All types—to your specifications

With our modern facilities we can produce all types of gears in any material, quantity or size—*promptly —economically.*

Take advantage of our experience of "OVER A QUARTER OF A CENTURY MAKING GEARS." Ask for a Braun estimate.

BRAUN GEAR CO.

1590-1608 ATLANTIC AVE., BROOKLYN, N.Y.

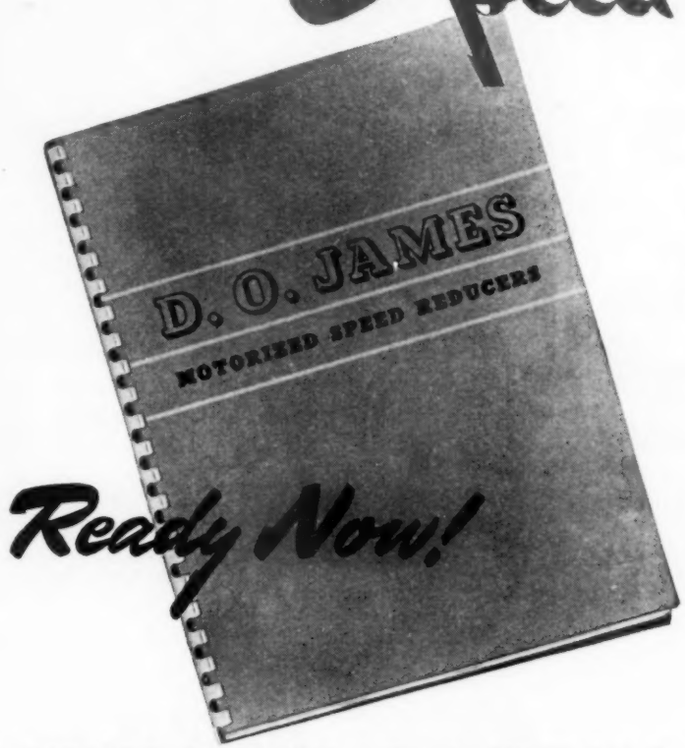
FINE GEARS of All Types and Sizes

Spur Gears—½ in. to 30 ft. in diameter
Bevel—Gears ½ in. to 13 ft. in diameter
Spiral Gears—½ in. to 10 ft. diameter
Worm gears in any practical size

THE EARLE GEAR & MACHINE CO.
4723 Stenton Ave. Philadelphia, Pa.
58 Liberty St New York City

EARLE GEARS

MOTORIZED Speed Reducers



D. O. James Motorized Reducers are precision manufactured to meet the requirements of service for which they are designed. They have the highest possible efficiency, accessability and are most compact.

Motorized Worm Gear Reducer

THIS CATALOG CONTAINS

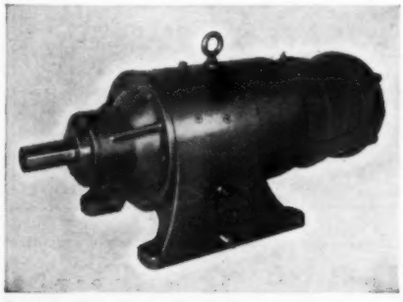
112 pages of engineering data, weights and prices of the D.O.James line of Motorized Reducers. It lists completely, selection tables, service factors and character of load. Information therein will prove helpful to your engineering department in the selection of the proper type of Motorized Reducer.

Motorized Worm Gear Reducer
With either horizontal or vertical drives. Made in 11 sizes, ratios 6 to 65:1 and a horse power range of 1/8 to 50 H. P.

Motorized Helical Reducer
With either horizontal or vertical drive. 13 sizes, ratios 1.2 to 9:1. 3/4 to 50 H. P.

Motorized Planetary Reducer
Horizontal and vertical drive, made in 35 sizes, ratios 10 to 1200:1, 3/4 to 75 H. P.

Motorized Helical Reducer



Motorized Planetary Reducer

*Send it to us!*_____

D.O.JAMES

1130 WEST MONROE STREET • CHICAGO, ILLINOIS

FOR OVER 50 YEARS MAKING ALL TYPES OF GEARS AND GEAR REDUCERS

For a permanent and economical solution to your seating problems in office and plant, you'll choose . . .

"HALLOWELL" STEEL STOOLS

Fig. 1334

Fig. 1267

Fig. 1249

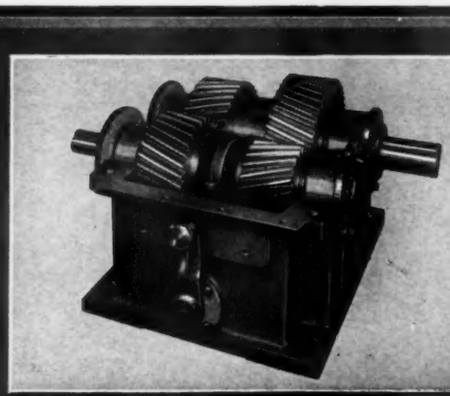
Steel construction for lasting wear . . . welded joints for lifetime rigidity make "Hallowell" Stools the logical choice for your seating equipment.

Your logical selection from the standpoint of price, too. For not only is the initial cost surprisingly low, but "Hallowell" Steel Stools are a lasting investment—and they pay dividends daily in the increased efficiency of every worker.

It's been established that inadequate seating facilities, which result in restricted movement and poor posture, do reflect in lowered vitality and workmanship that's not always up to par. Therefore, each of the many "Hallowell" models and types available for all kinds of jobs has been designed to relieve unnecessary fatigue. At the same time each has been built for years and years of service — without developing the "rocking chair blues" so common in ordinary riveted stools.

Our catalog describes and illustrates the full line of "Hallowell" Stools and Chairs. Write for it now and select the models that will solve the seating problems in your office and plant!

STANDARD PRESSED STEEL CO.
JENKINTOWN, PENNA. BOX 4
BRANCHES
BOSTON · DETROIT · INDIANAPOLIS · CHICAGO · ST. LOUIS · SAN FRANCISCO



GRANT

Complete ranges of sizes from fractional to 100 h.p. Reductions up to 4000 to 1.

GRANT GEAR WORKS-Boston

WHERE TO BUY IT?

The most comprehensive directory of metal-working equipment ever compiled by American Machinist

STARTS ON PAGE 401

USE IT TO LOCATE SUPPLIERS OF THE EQUIPMENT YOU NEED DURING 1941

GANSCHOW GEARS
FOR SIXTY YEARS
Spur – SPEED REDUCERS – Worm
ALL TYPES OF CUT GEARS
GANSCHOW GEAR CO., 1007 W. Washington, Chicago

TO PROTECT ROLL FINISH

AGAINST RUST

Grinding 14 ton calendar rolls to a fine finish was no trick at all in a Wisconsin machine shop, but protecting that finish until the rolls were put into service was another problem.

Some rust preventives that gave good protection were hard to apply. Others were difficult to remove. None seemed to fill this shop's requirements until a Standard Oil Engineer introduced Stanorust.

The illustration shows just how easy it was to apply Stanorust. Paper mill men reported that it was just as easy to remove. And after using Stanorust two years there has not been one complaint of rusted rolls.

You can get a grade of Stanorust for practically every job requiring rust protection. Some grades are swabbed on the work. Others are applied by spraying or dipping. Just show a Standard Oil Engineer the job you want done. He'll pick the grade you need. Then test it. You can reach one of these Engineers through your local Standard Oil (Indiana) office or by writing 910 South Michigan Avenue, Chicago, Illinois.

Copr. 1941, Standard Oil Co. (Ind.)

STANORUST

TANDARD OIL COMPANY (INDIANA)

ICATION ENGINEERING...LUBRICATION ENGINEERING...LUBRICATION ENGINEERING...LUBRICATION ENGIN

NG • • LUBRICATION ENGINEERING • • LUBRICATION ENGINEERING • • LUBRICATION ENGINEERING • • LUBRICA

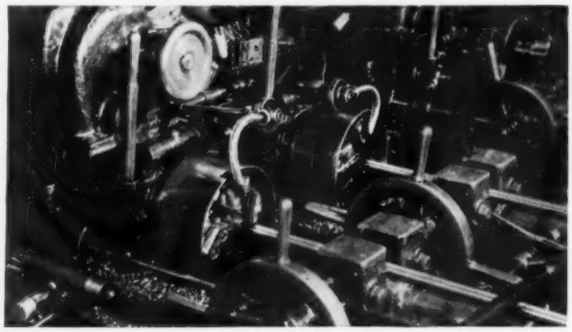
ACME CUTTING OIL REDUCES REJECTED PARTS IN THREADING

Threading steel rods should have been a simple operation in a Detroit metal working shop, but everything seemed to happen on this job. Parts were being rejected for poor threads and tool life was short.

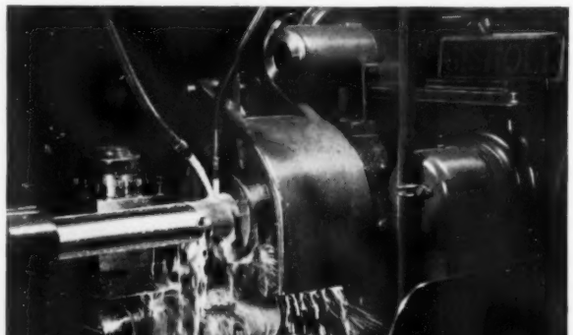
If you find yourself in a spot like that, do what this manufacturer did. Ask a Standard Oil Engineer's advice.

In this instance, the Engineer recommended a test of Acme. The first trial showed finished threads highly satisfactory, and better tool life was soon apparent.

If you are starting production on new machining or



grinding jobs in connection with national defense orders, it's a good time to start consulting the Standard Oil Engineer. He may help you avoid a great deal of trouble by starting these jobs with the right cutting lubricant.



SUPERLA SOLUBLE OIL ELIMINATES RUSTING OF PARTS AND MACHINES

Because production of machine tools has become all important, the following statement of a midwestern manufacturer on his experience with Superla Soluble Oil is doubly significant right now. He says:

"Superla Soluble Oil is helping to keep this plant at peak production by its fine cooling properties and its ability to make fine finishes possible."

As further proof of the adaptability of Superla to many jobs the writer says:

"Machining a clutch gear blank (see illustration) on a Gisholt 1L High Production Turret Lathe with the aid of Superla Soluble Oil is just one of the countless applications in our shops. Every job must be held to close tolerances, and our 10-year experience with Superla has shown conclusively that its use is a big help in maintaining the accuracy built into these machines, since it will not cause hardened steel ways to rust or gum up."

STANODRIP KEEPS MOTORS CLEAN . . . USES ½ THE OIL

To look at the unusually clean motor generator unit pictured above, you'd never suspect that it had been a constant trouble-maker for a Wisconsin manufacturer.

It ate up oil almost as fast as it was filled. Oil leaked into the housing, dust and dirt collected inside and out, and unless it had been cleaned frequently the motor would easily have become permanently damaged.

The plant superintendent and the Standard Oil Engineer he called in both agreed that the trouble was caused by oil creeping along the motor shaft. What the superintendent didn't know was that Stanodrip was an oil developed particularly for such hard-to-lubricate jobs. The Engineer picked the right grade and made a test.

Now the unit is just as clean inside as out. Maintenance has dropped to practically zero, oil consumption is cut in half, and a serious fire hazard has been eliminated.

Few plants haven't some "black sheep" in motors, bearings, gears, or machines that refuse to respond to ordinary care and lubrication. Why not let a Standard Oil Engineer help you get rid of your "troublemakers." The little time you'll spend with him may save many hours of machine and maintenance time later. And time is all you'll spend; his service costs nothing.

HERE'S WHERE YOU'LL FIND STANDARD OIL ENGINEERS

If you are located in or near any of the cities listed below, a phone call or card will bring a Lubrication Engineer capable of taking on practically any lubricating problem you have. If he can't answer your questions, he has a large staff of technical experts to call on for help.

STANDARD OIL COMPANY (INDIANA)
910 S. Michigan Avenue, Chicago, Illinois

Billings, Montana
Chicago, Illinois
Davenport, Iowa
Decatur, Illinois
Denver, Colorado
Des Moines, Iowa
Detroit, Michigan
Duluth, Minnesota
Evansville, Indiana
Fargo, North Dakota
Grand Rapids, Michigan
Green Bay, Wisconsin
Huron, South Dakota
Indianapolis, Indiana
Joliet, Illinois
Kansas City, Missouri
LaCrosse, Wisconsin
Mankato, Minnesota
Mason City, Iowa
Milwaukee, Wisconsin
Minneapolis, Minn.
Peoria, Illinois
Quincy, Illinois
Saginaw, Michigan
St. Joseph, Missouri
St. Louis, Missouri
South Bend, Indiana
Wichita, Kansas

Omaha: Standard Oil Company of Nebraska.

The Direct Way

AN ALL-ELECTRIC ADJUSTABLE-SPEED DRIVE FOR A-C CIRCUITS

Speed Ranges up to 16 to 1 — Sizes 1 to 30 hp.

RELIANCE V★S DRIVE

THE V★S way shortens the distance from power to work. It's the direct way, eliminating intermediate speed-changing devices, clutches, gear trains, a multiplicity of handles and knobs. It makes full use of the electric motor as a simple speed-changing device as well as a power unit (1).

From one handle in a convenient spot speeds are changed smoothly over ranges up to 16 to 1 while the machine is running. To stop, press a button; to start again, press another and the machine comes back to its previous speed (2).

And here are more features that help step up production: quick stopping, reversing, safe speeds for threading and inching, ample starting torque with smooth acceleration.

Using a proven principle of speed control, the Reliance V★S Drive now gives you these many advantages at a new low price. This is possible because of the packaged speed control unit (3) which is connected by three wires to a 3-phase a-c. power circuit. It takes little space and can be mounted anywhere.

RELIANCE ELECTRIC & ENGINEERING COMPANY
1088 Ivanhoe Road • • • Cleveland, Ohio

BIRMINGHAM • BOSTON • BUFFALO • CHICAGO • CINCINNATI • DETROIT • GREENVILLE (S. C.)
HOUSTON (TEX.) • LOS ANGELES • NEW YORK • PHILADELPHIA • PITTSBURGH • PORTLAND (ORE.)
ST. LOUIS • SAN FRANCISCO • SYRACUSE (N. Y.) • AND OTHER PRINCIPAL CITIES.

CONVENIENCE, WITHOUT LIMITATIONS

The start-stop button and speed changer can be placed anywhere that you can run a wire. Grouped with other control elements for the machine they make centralized control complete.

Get Bulletin 309 for details.

RELIANCE A-C D-C MOTORS

MORE THAN

$50,000,000

PER YEAR FOR EYE-INJURIES...

How Much of this Do They Get YOU For?

This is industry's average annual bill for LOST and Damaged Eyes. And it covers only the *traceable costs* of eye injuries . . . compensation, medical care, administrative work, loss of time and production. It does *not* cover hidden costs like lowered employee-morale, slowed production, loss of valuable skill.

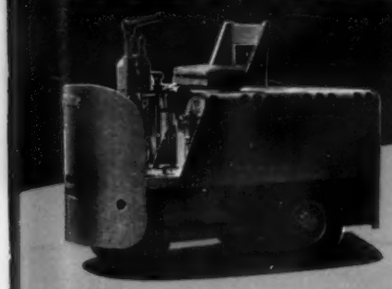
Now, when every hour and dollar is vitally needed in the effort for National Defense, neither this country *nor your company* can any longer afford to absorb any part of this needless loss. This fact must be faced: Intelligently planned Eye-Protection is an immediate necessity. And we are fully prepared to put it into effect for you . . . quickly, economically and without disrupting your production.

AMERICAN OPTICAL COMPANY

Southbridge *Massachusetts*

9090

IS YOUR MATERIAL HANDLING SYSTEM *Improved* TO ITS HIGHEST EFFICIENCY TO MEET NATIONAL DEFENSE NEEDS?



Model "TNN" Tractor with pneumatic tires. Has powerful spur gear drive, exceptionally compact and easy to maneuver. Rated DBP capacity 485 lbs. normal—2000 lbs. ultimate.

Model "THTF-L"—Fork truck offers new opportunities for lowest cost unit load handling and storage on pallets. Capacities 3000 to 7000 lbs. Standard telescopic lift 119"—Collapsed height 83" for box car operation.

Model "CHTF"—Light-duty fork truck designed expressly for light unit load operation. Capacities 1000 and 2000 lbs. Has full telescopic fork lift 120"—Collapsed height 83". Exceptionally compact for box car operation and narrow platform or aisle maneuvering.

TRADE **AUTOMATIC** MARK

That's an important reminder at the start of 1941 because more than ever before every industry will be called upon to give unrelenting and timely support to the National Defense Program by meeting contract schedules.

This means you must have the highest efficiency in the movement and storage of materials to cope with your increased production demands.

That's where "AUTOMATIC" is prepared to perform its part in this program by furnishing you with proven equipment to give your system top-performance and low-cost materials storage and transportation. Industrial research over the past few years will give you the benefit now, without experimenting, of the latest and most satisfactory types.

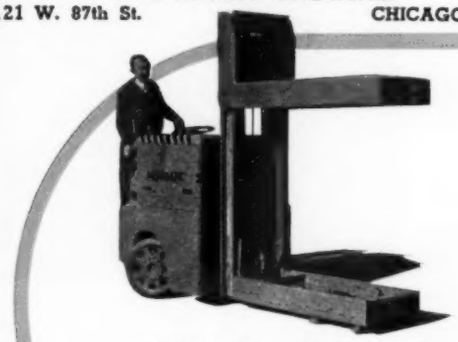
The most popular standard type "AUTOMATICS" are illustrated here. So write, 'phone, or wire for complete details or for an "AUTOMATIC" representative to discuss your material handling problems now.

☆ ☆ ☆

AUTOMATIC TRANSPORTATION CO.

DIV. OF THE YALE & TOWNE MFG. CO.

121 W. 87th St. CHICAGO, ILL.



Model "TLO-5"—For heavy duty transportation plus tiering of 10,000-lb. capacity skid loads. Has standard platform 60" long, 26¼" wide, 11" high with 60" lift. The very latest in electrical control—construction styling and performance efficiency.

Model "LO-5"—For heavy-duty top-performance and efficiency to handle 10,000-lb. skid loads. Has standard platform 60" long, 26" wide, 11" high with 5" lift. Speed-O-Matic Drive control, Equa-poised drive and Dyna-trol lift units.

Model "LN-3"—For speedy transportation and placing of 6000-lb. skid loads. Has standard platform 55" long, 27" wide, 10¾" high with 6" lift—Spur gear, drive and lift units—Rotor-Brush control system.

Model "TLN-3"—For 6000-lb. skidloads tiering plus transportation. Has standard platform 55" long, 27" wide, 10¾" high, 60" lift.

Model "EN-2"—Exceptionally speedy and efficient for ramp operation. Equipped with pneumatic tires for outdoor service. Platform deck 100" long, 51" wide, 29" high. Has heavy-duty spur gear drive—Hand wheel steer and Rotor-Brush control.

AUTOMATIC TRANSPORTATION COMPANY

DIV. OF THE YALE & TOWNE MFG. CO.

121 W. 87th St. CHICAGO, ILL.

Gentlemen: Please send details on models referred to above.

Name_____

Address_____

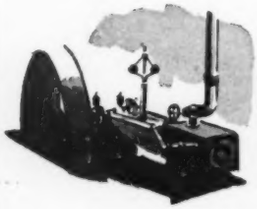
Company_____

City_____ State_____

WHEN YOU BUY TRUCKS · · Buy "AUTOMATIC"

PIONEERS

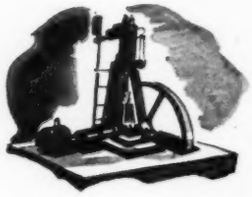
SINCE 1866—the Makers of Gargoyle Lubricants have kept step with Industry's Progress — Pioneering new lubricants to meet new needs.



1876—
600-W FOR
STEAM ENGINES

1877—
OIL FOR MR.
SELDEN'S AUTO

1896—VELOCITE
OILS FOR HIGH-
SPEED SPINDLES



1900—OIL FOR
LUBRICATING
DR. DIESEL'S ENGINE

1940—S. S. AMERICA
100% GARGOYLE
LUBRICATED

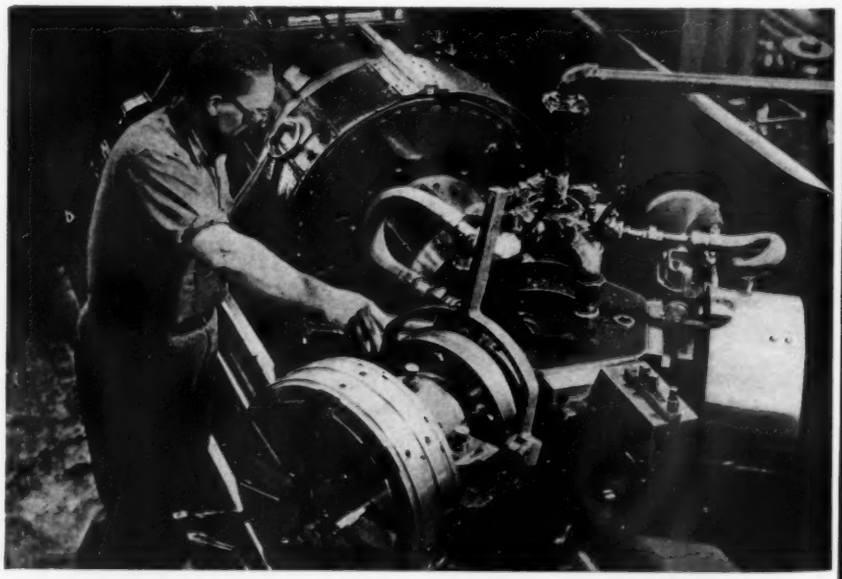
TODAY—machine operators rely on Gargoyle Vactra Oils as the "A-1" universal lubricants.

These oils are famous for their "persistence of film" characteristics —a quality that 75 years' industrial experience helped to develop.

Yet Vactra Oils are just one example of the complete Gargoyle line.

Socony-Vacuum today offers "correct" oils for every type of machine —oils developed in close cooperation with machine builders . . . backed by half-a-million case histories.

SOCONY-VACUUM OIL CO., INC., Standard Oil of New York Division—White Star Division—Lubrite Division—Chicago Division —White Eagle Division—Wadhams Division—Magnolia Petroleum Company—General Petroleum Corporation of California.



CALL IN Socony-Vacuum for

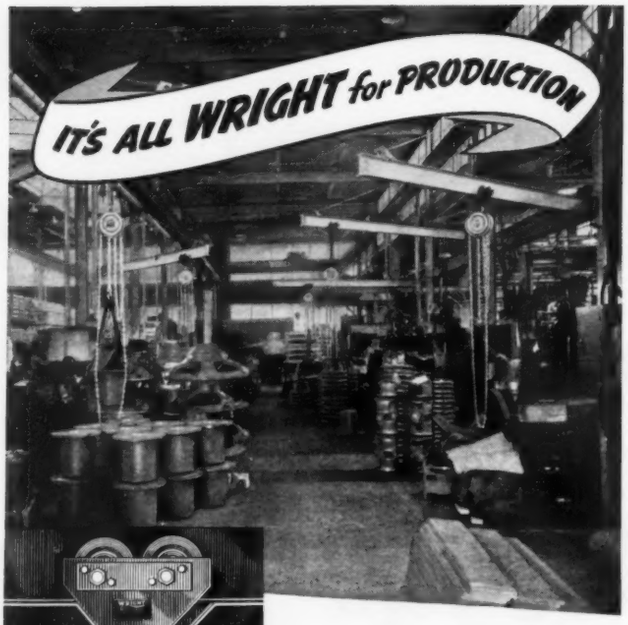
for 75 Years

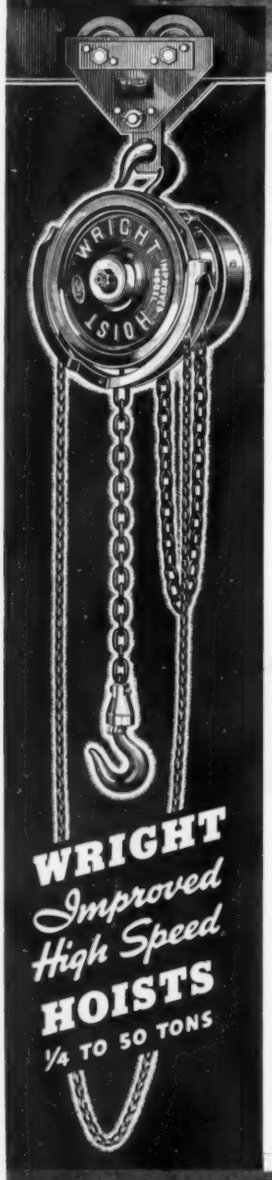
GARGOYLE

Lubricants

The Emblem of
75 YEARS' PIONEERING
in "Correct Lubrication"
1866-1941

"Correct Lubrication"





Speed—economy—safety! That's the demand of American industry today. And the **Wright Improved High-Speed Hoist** is one of the answers to that demand.

In the first place, the inclusion of the words "High Speed" in the WRIGHT HOIST name is a statement of fact. They mean what they say. The WRIGHT HOIST *is fast*, smooth and positive in action—because of its load wheel and driving spindle bearings.

WRIGHT'S economy comes through its rugged and precision design—its year-in and year-out durability—its full zinc coating which makes WRIGHT HOISTS immune to corrosion.

And safety is inbuilt. The load chain has a safety factor of 7 to 1 and the special process steel of which it is made permits the chain to elongate (because of overload) 3″ to the foot before breaking. This same visual factor of safety is inherent in the bottom hook because this hook will slowly open to indicate overload beyond the elastic limit of the chain.

WRIGHT TROLLEYS are made to give the same fast—economical—safe service as WRIGHT HOISTS. Write for your copy of the new Wright Catalog and learn the 21 points of WRIGHT superiority.

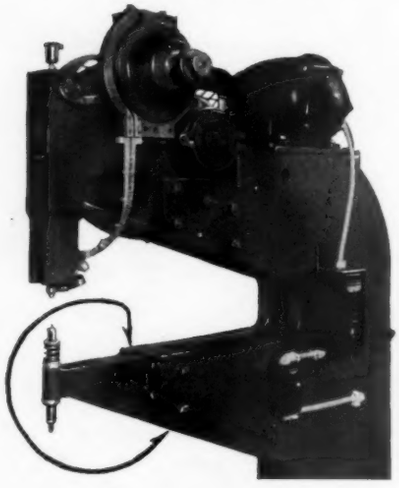
WRIGHT MANUFACTURING DIVISION
YORK, PENNSYLVANIA

AMERICAN CHAIN & CABLE COMPANY, Inc.
In Business for Your Safety

for . . .
more solid rivet joints per . . .

RIVITOR

(minimized change-over time)



Sustained production with but small loss of time for "change-overs" is possible with this **RIVITOR.**

• Complete horn sections, carrying the anvil mechanism, may be transferred to another Rivitor (this type) which has the required throat depth to get the next rivet locations.

• This not only permits maximum machine utilization but also accommodates more automatic feed riveting without having to have additional complete machines. At the same time the deep throat machines can be kept busy with work requiring that accommodation. Information on these and other type Rivitors will be sent promptly, address

THE TOMKINS-JOHNSON CO.
615 N. Mechanic Street **Jackson, Michigan**

CAN YOU DEFEND YOUR CUTTING-OIL COSTS?

This **TOLHURST CHIP WRINGER**

Reclaims up to 99% of Oil on Your Chips

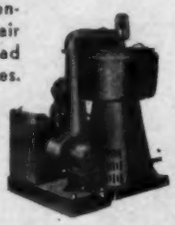
Tolhurst Chip Wringers will reclaim up to 99% of oil on your metal chips. These record-breaking oil recoveries are accomplished by utilizing centrifugal force. No steam is used, thereby eliminating any loss of oil through emulsification. Operation is simple and ***safe*** — unskilled operators can run them efficiently. Tool room records of Tolhurst users show that tool wear is reduced as much as 50%. Tolhurst Chip Wringers are available in 20", 26", 40" and 48" baskets. Satisfied Tolhurst users include Allis-Chalmers, Chrysler Corporation, Ford Motor Company, Frigidaire and scores of others. Decide ***now*** to investigate Tolhurst Chip Wringers for saving money in your plant. Use the handy coupon below to get details and latest prices!

TOLHURST GALVANIZERS

Equally effective for tinning or galvanizing parts. "Spin off" excess spelter from batches of small parts in as little as two seconds time! Coating thickness regulated by accelerating rate. Imparts smoother, evener finish. Write for complete information. Use the coupon below!

TOLHURST METAL DRYERS

For small metal parts. Parts to be dried are placed in a ***removable*** perforated basket in the dryer. Centrifugal force and hot air completely dry the load in two to three minutes. Eliminates use of sawdust. Imparts beautiful, uniform finish. To get details, use the coupon below!



TOLHURST DETERGENT WASHERS

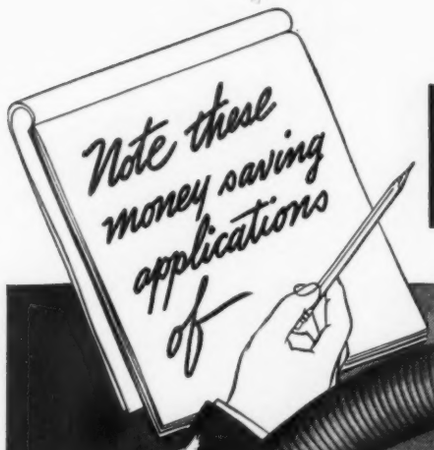
New method for batch cleaning of small machined parts. Washes, rinses, dries small machine parts in one step. Hot detergent solution removes oil, grease, dirt and fine chips. Centrifugal force completely dries parts with or without hot air blast. Get FREE details. Use coupon below!

TOLHURST
CENTRIFUGAL DIVISION
American Machine and Metals, Inc.
EAST MOLINE, ILL.

TOLHURST DIVISION
1601 Tolhurst St., East Moline, Illinois

YES Send details on ☐ Chip Wringers; ☐ Metal Dryers; ☐ Galvanizers; ☐ Detergent Washers. I understand that there is no obligation.

NAME_____
FIRM NAME_____
ADDRESS_____
CITY _____ STATE_____



FLEXIBLE METAL HOSE

A TOUGH JOB MADE EASY. Sharp-edged metal particles that whirr and scrape their way through a blower system are a menace to the conveyor. And even more of a threat when the particles have to turn a corner, for they will impinge their full force on the turn. Flexible metal hose here reduces that additional threat by permitting a gradual bend and at the same time providing all the strength and toughness possessed by rigid pipe. In short, a tough job made easy—and economical—through flexible metal hose. American Metal Hose makes all types of hose, for all kinds of applications, where the flexibility of hose and the strength of all-metal construction are required.

WORKS DEPENDABLY UNDER PRESSURE. On this gear tooth pointing machine, made by Cross Gear & Machine Co., Detroit, the pressure cylinder line is of the toughest tubing you can buy. It's American Seamless...as strong as rigid pipe...as pressure-tight as the seamless tube from which it is made . . . and as flexible as garden hose. Because it is all these things, this machine is safeguarded against down-time losses due to failure in the pressure line. Perhaps there are identical losses in your plant, losses that can be ended surely and quickly with American Seamless. Check your requirements with the facts and details in our book SS-25. A penny post card is all the expense you will have to obtain this 24-page, fully illustrated catalog. Ask for it now. 40262

American Metal Hose

ANACONDA
from mine to consumer

AMERICAN METAL HOSE BRANCH of THE AMERICAN BRASS COMPANY
General Offices: Waterbury, Conn. • Subsidiary of Anaconda Copper Mining Company
In Canada: Anaconda American Brass Ltd., New Toronto, Ontario

Parts and Materials

ELECTRIC MOTORS • MISCELLANEOUS ELECTRICAL EQUIPMENT • BALL AND ROLLER BEARINGS • VALVES AND FITTINGS • MISCELLANEOUS MACHINE PARTS • MATERIALS • PROCESSES

AMERICAN MACHINIST'S 28TH ANNUAL BUYERS REFERENCE NUMBER

A few of the basic *individual* characteristics of both Cast Iron and Steel are listed. ***MEEHANITE*** castings offer you, through composition and structural control, a *combination* of these properties, permitting simplification of design and demanding no sacrifice of one in order to be assured of another.

Write for the property Wheel Chart It tells you what you can get with Meehanite

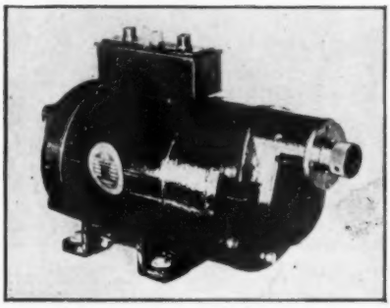
When you specify ***MEEHANITE*** you are not specifying just another cast iron but a *special* material—tested step by step and manufactured with your needs in mind. It is able to supply you with the right combination of engineering properties for your job.

Meehanite Research Institute · 311 ROSS STREET · PITTSBURGH, PA.

Take Your Casting Problems to a Meehanite Foundry!

Ansonia, Conn.	Farrel-Birmingham Co., Inc.
Bethayres, Pa.	H. W. Butterworth & Sons Co.
Bridgewater, Mass.	The Henry Perkins Co.
Buffalo, N. Y.	Pohlman Foundry Co., Inc.
Charleston, W. Va.	Kanawha Manufacturing Co.
Chattanooga, Tenn.	Ross-Meehan Foundries
Chicago, Ill.	Greenlee Foundry Company
Cincinnati, Ohio	Cincinnati Grinders Incorporated
Cincinnati, Ohio	The Cincinnati Milling Machine Co.
Cleveland, Ohio	Fulton Foundry & Machine Co.
Denver, Colo.	The Stearns-Roger Mfg. Co.
Detroit, Mich.	Atlas Foundry Co.
Flint, Mich.	General Foundry & Mfg. Company
Hamilton, Ohio	Hamilton Foundry & Machine Co.
Irvington, N. J.	Barnett Foundry & Machine Co.
Los Angeles, Calif.	Kinney Iron Works
Milwaukee, Wis.	Koehring Company
Mt. Vernon, Ohio, Grove City, Pa.	Cooper-Bessemer Corporation
New York, N. Y.	The American Brake Shoe & Foundry Co.
Oakland, Calif.	Vulcan Foundry Company
Orillia, Canada	E. Long, Ltd.
Philadelphia, Pa.	Florence Pipe Foundry & Machine Co., (R. D. Wood Company, Selling Agents)
Phillipsburg, N. J.	Warren Foundry & Pipe Corp.
Pittsburgh, Pa.	Meehanite Metal Corporation
Pittsburgh, Pa.	Rosedale Foundry & Machine Co.
Rochester, N. Y.	American Laundry Machinery Co.
St. Louis, Mo.	Banner Iron Works
St. Paul, Minn.	Valley Iron Works
London, Eng.	The International Meehanite Metal Co., Ltd.
Waterloo, N. S. W.	Australian Meehanite Metal Co., Ltd.
Johannesburg, South Africa,	Meehanite Metal Co. (S.A.) (Pty.) Ltd.

PARTS and MATERIALS



GEARMOTOR — *Walker-Turner Co., Plainfield, N. J.* Shock-proof gearmotors are made with a double winding which together with an interlocking switch provides two speeds instantly changeable. Speeds from 700 to 8,000 r.p.m. and sizes from ¼ to 3 hp. for polyphase circuits are available. Vol. 84, p. 948.

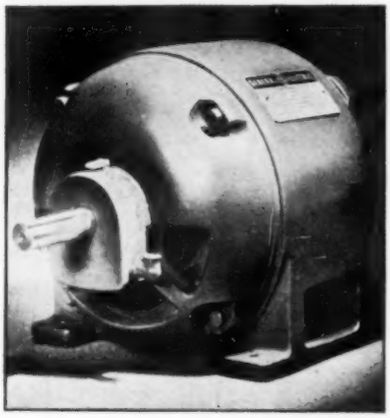
UNIVERSAL MOTORS—*Dumore Co., Racine, Wis.* Types A and A3 fractional-horsepower motors are improved by addition of self-aligning bearings. Identified as types AA and A3A, they are rugged, general-purpose 1/20 and 1/10 hp. universal motors. (Not shown.) Vol. 84, p. 1044.

D.C. MOTORS—*General Electric Co., Schenectady, N. Y.* Compactness and improved protection feature these d.c. motors. Rolled-steel frame and improved end-shield and bearing-bracket construction give them better protection from external damage. "Formex" coils and special insulating varnish provide high resistance to impact, abrasion, and action of foreign materials. Open motors are available in constant-speed ratings from ½ hp. at 850 r.p.m. to 60 hp. at 1,750 r.p.m., and in adjustable-speed ratings from ½ hp. at 850/3,400 r.p.m. to 15 hp. at 500/1,800 r.p.m. (Not shown.) Vol. 84, p. 995.

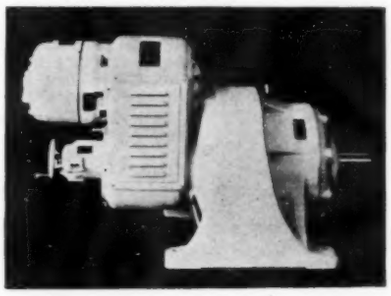
GEARMOTORS—*U. S. Electrical Motors, Inc., Dept. 23, 80 34th St., Brooklyn, N. Y.* Double and triple reduction gearmotors up to 300 hp. at 91 r.p.m. have been added to the "Synerogear" line. (Not shown.) Vol. 84, p. 1048.

INDUCTION MOTORS — *Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa.* Type CS sleeve-bearing squirrel-cage induction motors have been designed especially for general purpose applications such as machine tools, pumps, and auxiliary drives. They are available in ratings from ½ to 5 hp., at speeds from 875 to 3,600 r.p.m. for operation on 110, 220, 440, and 550 volts, 2 and 3 phase. Vol. 84, p. 1104.

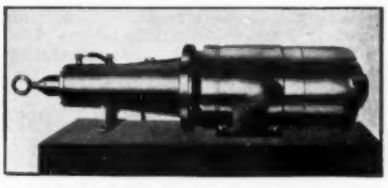
A.C. MOTOR—*Fairbanks Morse & Co., 600 S. Michigan Ave., Chicago, Ill.* Integral horsepower, vertical, single-phase motors (not shown) in sizes from ¾ to 5 hp. are claimed to be adaptable for operation in isolated localities where they will receive little attention. Design is such that dripping or splashing water will not reach vital parts. Operating speeds are 1200, 1800 and 3600 r.p.m. Vol. 84, p. 556.



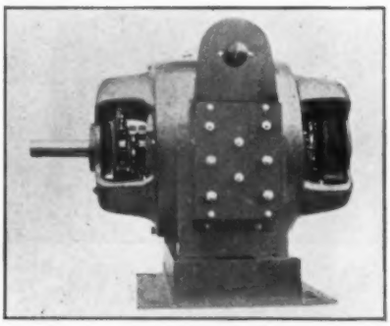
INDUCTION MOTOR—*General Electric Co., Schenectady, N. Y.* "Tri-Clad" induction motors feature streamlined appearance, more complete protection, major advances in insulation of current-carrying parts, and improved bearing design and lubricating arrangements. Cast-iron box type frame and "Formex" insulation are used. Vol. 84, p. 1046.



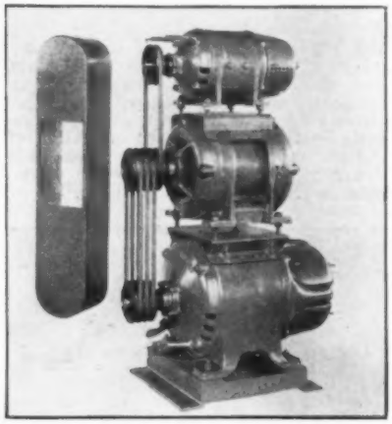
GEARMOTOR—*U. S. Electrical Motors, Inc., 80 34th St., Brooklyn, N. Y.* Units which are more compact, smaller and lighter are achieved through the elimination of a sub-base on the Type VEV-GD and VEV-GT "Varidrive" gearmotor. These motors have double and triple reduction gears. Further modification of the former design is mounting the "Varidrive" case at any angle with respect to the gear case. Vol. 84, p. 784.



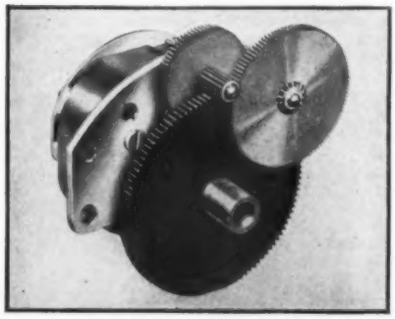
THRUST MOTOR—*B. A. Wesche Electric Co., 1622–1628 Vine St., Cincinnati, Ohio.* "Welco" push-pull motor can be used in any position. It produces a 4000-lb. thrust. Vol. 84, p. 900.



D.C. MOTOR—*Kato Engineering Co., 530 N. Front St., Mankato, Minn.* In addition to driving equipment, these d.c. motors furnish 60-cycle power for operation of auxiliaries. Vol. 84, p. 444.



MOTOR-GENERATORS — *Allis-Chalmers Mfg. Co., Milwaukee, Wis.* Saving in floor space, greater accessibility, and use of machines of different speeds are outstanding features of "Pyramid-Mounted" three-machine motor-generator sets. They are available in sizes up to 10 kw. Vol. 84, p. 67.



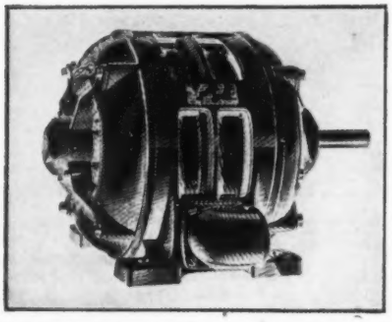
GEAR REDUCTIONS — *Barber-Colman Co., Rockford, Ill.* Open-type gear reductions have been made available for size YAr motors. Three standard gear ratios provide output shaft speeds of 80, 54 and 11 r.p.m. Vol. 84, p. 114.

PUMP MOTOR—*U. S. Electrical Motors, Inc., Dept. 33, 80 34th St., Brooklyn, N. Y.* This pyramidal base pump motor does away with possibility of misalignment. Mounting is an integral part of the motor. (Not shown.) Vol. 84, p. 560.

PARTS and MATERIALS—Electric Motors

CAPACITOR MOTOR—*Bodine Electric Co., 2264 W. Ohio St., Chicago, Ill.* Only 2⅝ in. wide and high, with 1⅝ in. over-all length, Type K capacitor motor can be supplied with three different windings: synchronous capacitor, non-synchronous capacitor, dynamic braking capacitor. Standard ratings on 60 cycles are, respectively: 1/1500 hp. at 1,800 r.p.m.; 1/100 hp. at 1,700 r.p.m.; and 1/1500 hp. at 1,200 r.p.m. Motor input is 8 watts. Vol. 84, p. 350.

MOTOR—*U. S. Electrical Motors, Inc., Dept. 23, 80 34th St., Brooklyn, N. Y.* End shields having a flat surface to facilitate mounting pumps and other directly driven equipment, and for magnetic brakes, are provided on a line of electric motors. Shields are available either machined to standards or unmachined. (Not shown.) Vol. 84, p. 32.



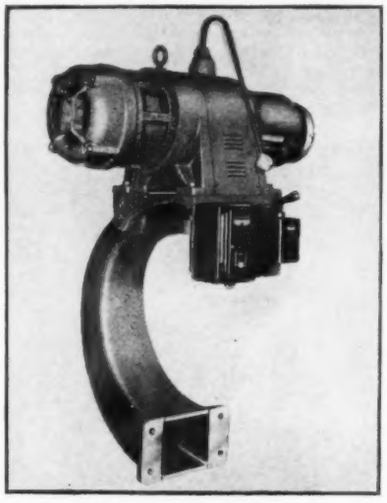
MOTOR—*Louis Allis Co., 133 E. Stewart St., Milwaukee, Wis.* Supplied with either high starting torque or normal starting torque, the "Lo-Amp" electric motor has low locked rotor current. It has no centrifugal switches, relays, brushes or slip rings. Vol. 84, p. 267.

ELECTRIC MOTOR—*Emerson Electric Mfg. Co., 2088 Washington Ave., St. Louis, Mo.* A line of shaded pole electric motors (not shown) in pressed steel frames are available in two frame sizes, with capacities ranging from approximately 1/400 to 1/25 hp. They are equipped with self-aligning wool-packed, oil impregnated bearings. Vol. 84, p. 556.

EXPLOSION-PROOF MOTORS — *U. S. Electrical Motors, Inc., Dept. 23, 80 34th St., Brooklyn, N. Y.* Class I Group D and "Doublenclosed" explosion-proof motors come equipped with oil lubricated ball bearings and constant level oilers. They are furnished as standard on all 3600 r.p.m. ratings and on all 1800 r.p.m. ratings larger than 25 hp. (Not shown.) Vol. 84, p. 482.

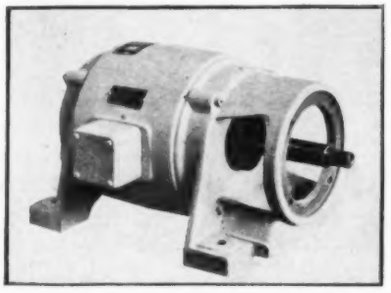
SHADED-POLE MOTORS — *Russell Electric Co., 370 W. Huron St., Chicago, Ill.* High locked rotor and accelerating torque, with high efficiency and large output per unit weight, is claimed for a line of ball-bearing, shaded-pole motors. These motors will operate in any position and will withstand substantial end thrust. Self-aligning, semi-oilless sleeve bearings are available. Power output ranges from three to fifteen watts. (Not shown.) Vol. 84, p. 396.

EXPLOSION-PROOF MOTOR—*U. S. Electrical Motors, Inc., Dept. 23, 80 34th St., Brooklyn, N. Y.* In Class I, Group D, explosion-proof motors, approved by National Board of Fire Underwriters, the ratings have been increased from 25 to 75 hp. while in Class II, Group G, they have been increased from 7½ to 75 hp. (Not shown.) Vol. 84, p. 272.



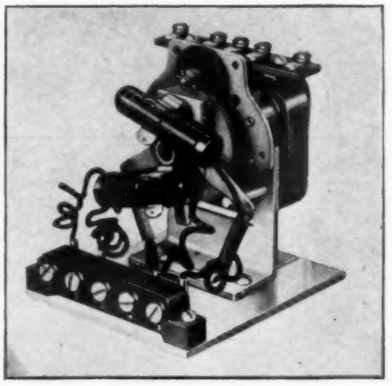
GEAR-SHIFT MOTOR—*Lima Electric Motor Co.*, subsidiary of *Lima Armature Works, Inc., 440 N. Main St., Lima, Ohio.* An automotive gear-shift providing instant speed changes without any belt shifting has been made available for machine tool application. This unit gives three speeds forward and one reverse, or four speeds forward when reversing can be accomplished through the motor. Vol. 84, p. 780.

MOTOR ROTOR—*General Electric Co., Schenectady, N. Y.* Longer motor life with less maintenance is claimed for the "Valv-Amp" type of rotor construction. Cast aluminum rotors in larger double squirrel-cage motors for high starting torque, low starting current service are made possible. (Not shown.) Vol. 84, p. 148.

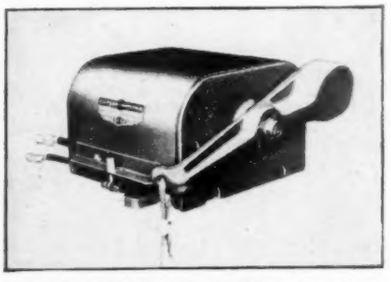


PUMP MOTOR—*Sterling Electric Motors, Inc., Telegraph Rd. & Atlantic Blvd., Los Angeles, Calif.* Standard dimension motors are designed for easy mounting of centrifugal and similar pumps. These ball-bearing motors have ratings from ½ to 40 hp. for operation on three phase at 2-, 4- and 6-pole speeds. Extended shafts and machined fits for the pump mounting are all standard and the same dimensions throughout the entire range of ratings. Vol. 84, p. 782.

CIRCUIT BREAKER—*Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa.* Type AB general utility circuit breakers for inclosure, panelboard or switchboard mounting feature adjustable trip setting. Rated at 50, 70, 90 and 100 amp. at 250 and 600 volts a.c., 2 and 3 pole, and at 125 and 250 volts d.c., they are especially adaptable to lighting and feeder circuits and to motor branch circuit protection. (Not shown.) Vol. 84, p. 646.



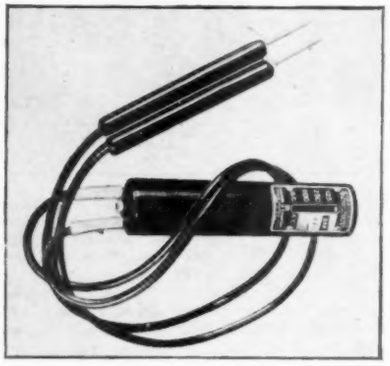
RELAY—*Barber-Colman Co., Rockford, Ill.* Consisting of a small reversible geared-head "Barcol" motor which tilts two mercury tubes, the "Moto-Relay" permits throttling, floating, or proportioning control of a 5-amp. load from a sensitive instrument having a current rating as low as 0.35 amp. Chattering is eliminated. Vol. 84, p. 1000.



CRANE STOP—*Cutler-Hammer, Inc., 205 N. 12th St., Milwaukee, Wis.* Main circuit crane safety limit stop prevents hook over-travel when hoisting. Taps are provided to adjust braking. A by-pass circuit permits backing out. Vol. 84, p. 1037.

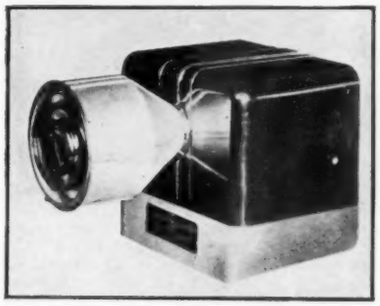
PULL-OUT CONTROL—*Cutler-Hammer, Inc., 205 N. 12th St., Milwaukee, Wis.* A 100-amp. pull-out service control (not shown) is available with or without branch circuits, being rated at 230 volts a.c. It is also available with two 60-amp. pull-outs; and 4, 6, or 8 plug fuse circuits rated at 115/250 volts. Vol. 84, p. 1048.

GALVANOMETER—*General Electric Co., Schenectady, N. Y.* A galvanometer (not shown) more than three times as sensitive as previous ones is suitable for temporary set-ups for factory and laboratory testing and permanent installations for testing instruments, material, and production apparatus where rapid readings and minimum operator fatigue are essential. Vol. 84, p. 999.



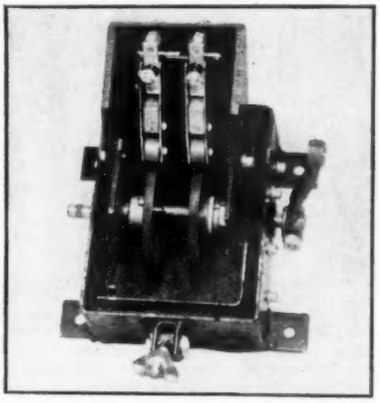
VOLTAGE TESTER—*Square D Co., Detroit, Mich.* Use of different colored bands for each alternating current voltage, together with increased pointer travel at higher voltages, makes possible easier readings with No. 5000 voltage tester. Vol. 84, p. 998.

Electrical Equipment—PARTS and MATERIALS



RELAY—*General Electric Co., Schenectady, N. Y.* This compact photoelectric relay for general-purpose applications operates at speeds up to 150 interruptions per min. at a minimum of 40 foot-candles at the phototube with not more than 15 foot-candles of extraneous light. Relay has a controlled contact rating of 10 amp. at 115 volts a.c. with two normally open and two normally closed contacts. Vol. 84, p. 1104.

TERMINAL—*Burndy Engineering Co., 459 E. 133rd St., New York, N. Y.* Type SNA-H "Streamlined" cable terminal facilitates taping. (Not shown.) Vol. 84, p. 998.



LIMIT SWITCH—*Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa.* Type XC-23 cam-operated limit switch with contacts arranged to swing open for easy inspection and maintenance has been designed especially for control circuits of such devices as hoists and industrial trucks. It is available with ratings of 2 amp. at 600 volts d.c. and 25 amp. at 110 volts a.c. Vol. 84, p. 1106.

MOUNTING STRIPS—*H. R. Kirkland Co., Morristown, N. J.* Stainless steel standardized mounting strips facilitate use in multiple of signal lights, toggle switches and pushbuttons. They are available in three lengths, to contain two, three, or five units per strip. (Not shown.) Vol. 84, p. 1106.

CIRCUIT BREAKER—*Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa.* Type DH "De-ion" air circuit breaker (not shown) is available in ratings from 100,000 to 250,000 kva. interrupting capacity; 600, 1200, and 2000 amp. for operation on 2500 and 5000 volts, three phase, 60 cycles. Features include inlaid silver-to-silver main contacts; arcing contacts of special tungsten alloy; and insulation of high voltage and control circuits. Vol. 84, p. 1108.

VIBRATION METER—*Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa.* This 8-oz. vibration meter indicates frequencies from 500 to 20,000 cycles per min. It consists of a thin spring steel vibrator clamped at one end between a set of steel rollers. A knurled knob rotates the rollers, moving the reed in or out, changing its vibration period. A sliding pointer on the reed indicates the frequency. (Not shown.) Vol. 84, p. 1042.

STARTER—*General Electric Co., Schenectady, N. Y.* Oil-immersed combination starter (not shown) for corrosive or hazardous gas locations is available with or without a circuit breaker. Vol. 84, p. 1102.

"MU-SWITCH"—*Mu-Switch Corp., Canton, Mass.* Comprising a phosphor bronze leaf spring riveted at one end to the switch cover and having at its free end a U-bracket which holds a ⅜x¼ in. plastic roller, this new style actuator adapts to high-speed cam operations the "Mu-Switch." Self-lubricated roller permits close bearing tolerances, with resulting accuracy. Vol. 84, p. 950.

CIRCUIT BREAKER—*Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa.* Designed primarily for protecting lighting and motor circuits, "Quicklag" circuit breaker combines cooperative magnetic and thermal trip. It is available in ratings of 15 to 35 amp., single pole only, 250 volts a.c. and 125 volts d.c. (Not shown.) Vol. 84, p. 946.

VOLTAGE REGULATOR—*Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa.* "Silverstat Junior" voltage regulator is available in d.c. ratings up to 25 kw. and a.c. ratings up to 44 kva. (Not shown.) Vol. 84, p. 944.

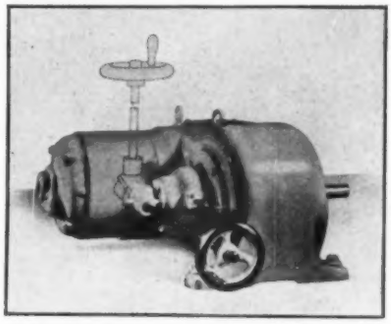
PHOTO-ELECTRIC RELAY—*Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa.* Type RQ "Photo-Troller" counts, sorts, weighs, measures, signals. It has two normally open and two normally closed contacts, each rated at 10 amp. on 115-volt a.c. circuits. Vol. 84, p. 76.

STARTER—*Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa.* Magnetic starters (not shown) for multi-speed squirrel cage motors of 220–660 volts, 1–100 hp., are available for the following types of multi-speed motors in 2, 3, or 4 speed types; constant horsepower, constant torque, variable torque, single winding and double winding. Vol. 84, p. 951.

PRESSURE SWITCH—*Center & Giveen Co., 2024 University Ave., Berkeley, Calif.* Model No. 15-45 "Mercotrol" mercury contact pressure switch has a cut-in pressure range of 10–40 lb. and a cut-out pressure range of 20–70 lb. Pressure differential between cut-in and cut-out can be varied from 10 to 60 lb. (Not shown.) Vol. 84, p. 896.

MOTOR CONTROL—*Cutler-Hammer, Inc., 205 N. 12th St., Milwaukee, Wis.* "Unitrol" system of sectionalized motor control permits all devices to be organized in locker-like centers instead of the usual pillar-and-post method of mounting. Standard motor control units are mounted in standardized cubicle sections which are made in 32 sizes, 8 widths and 4 heights. (Not shown.) Vol. 84, p. 894.

CABLE CONNECTOR—*Jackson Electrode Holder Co., 6553 Woodward Ave., Detroit, Mich.* Joints in arc welding cables are securely locked together with this insulated cable conductor. (Not shown.) Vol. 84, p. 996.



VARIABLE TRANSMISSION CONTROL—*U. S. Electrical Motors, Inc., Dept. 23, 80 34th St., Brooklyn, N. Y.* A right-angle remote control for "Varidrive" motors provides simple, accurate selection of operating speed. Control shaft may be extended at a 90-deg. angle in any one of eight different directions. Vol. 84, p. 150.

RECORDERS—*General Electric Co., Schenectady, N. Y.* Type CF2 inkless recorders (not shown) include direct-current instruments. Suitable for general testing and for use on moving vehicles, they make possible continuous operation for 30 days without attention, and may be operated at temperatures from –10 to 120 F. Vol. 84, p. 902.

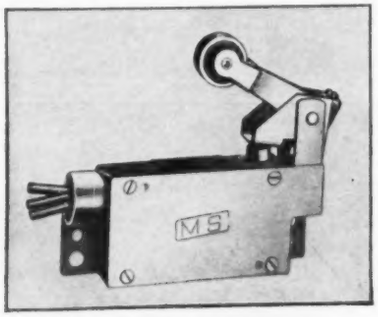
RECTIFIER—*Mellaphone Corp., Rochester, N. Y.* Model CR-6 electronic rectifier (not shown) converts a.c. into d.c. for operating five or six average-size magnetic chucks or other d.c. equipment. This compact rectifier has a d.c. output of 660 watts. It measures 7½x5½x16½ in. and weighs 26 lb. Vol. 84, p. 152.

MERCURY RELAY—*Durakool, Inc., 1010 N. Main St., Elkhart, Ind.* This unbreakable mercury relay utilizes displacement principle with solenoid actuation. Contact structure is hermetically sealed, making the unit suitable for corrosive or explosive atmospheres. It may be operated up to 300 times per minute. It is available in capacities up to 200 amp. Vol. 84, p. 396.

PARTS and MATERIALS—Electrical Equipment

MAGNETIC BRAKE—*Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa.* A magnetic brake for open type vertical axis gearless cable reels prevents cable from unwinding due to power failure. (Not shown.) Vol. 84, p. 648.

CIRCUIT BREAKER—*Square D Co., Detroit, Mich.* Type M "MultibreakeR" (not shown) for 3-phase, 4-wire, solid-neutral a.c. circuits of 120–208 volts is made in capacities from 15 to 100 amp. Vol. 84, p. 902.

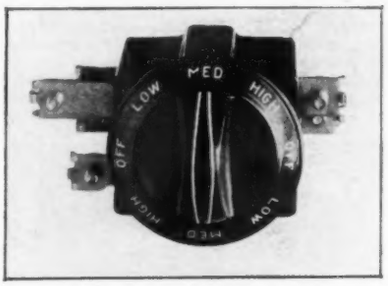


PRECISION SWITCH—*Micro Switch Corp., Freeport, Ill.* No. LK-2 precision limit switch is actuated by rotating or sliding cams. It has movement differential at the roller of 0.002 in., pretravel of 1 deg., overtravel of 20 deg. Switch is rated at ½ hp. up to 460 volts a.c. Vol. 84, p. 183.

MOTOR STARTER—*Cutler-Hammer, Inc., 205 N. 12th St., Milwaukee, Wis.* Savings in wall space, installation time and wiring costs are claimed for the Bulletin No. 9589 combination across-the-line starter and motor disconnect switch (not shown). Overload protection is provided by a thermal relay. Starter is available with three or four poles, in five sizes, with ratings from 6½ to 200 hp. Vol. 84, p. 268.

SWITCH HOUSING—*Micro Switch Corp., Freeport, Ill.* An unusually compact housing for the Micro Switch element is for use in explosive atmospheres. Measuring only 3⅝x2½x2 in., it keeps mounting space at a minimum by omitting feet and lugs and providing a tapped hole on each side. (Not shown.) Vol. 84, p. 644.

RECTIFIER—*Cassels Engineering & Machine Co., P.O. Box 114, Wauwatosa, Wis.* "Porto-Rect" power rectifiers require no special wiring. Their principal use is in operating magnetic devices and in adjustable speed control for d.c. motors. They are available in sizes from 12 to 200 amp. output. Vol. 84, p. 264.



MOTOR SWITCH—*Hart Mfg. Co., Hartford, Conn.* This on-and-off switch is designed for equipment using up to 1-hp. motors. Slow make-and-break principle is claimed to give long, trouble-free service. Vol. 84, p. 446.

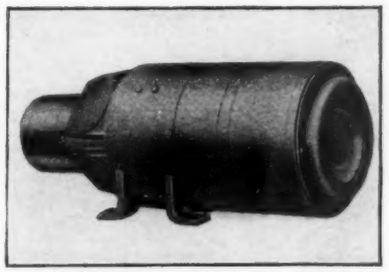
WATTMETER—*Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa.* A d.c. wattmeter (not shown) which operates from a standard 50-millivolt ammeter shunt employs construction similar to that of the usual d.c. shunted ammeter, except that the magnetic field is produced by an electromagnet energized from the line voltage. Vol. 84, p. 558.

CONTACTOR—*Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa.* An inclosed Type DN multi-pole contactor, Size 00, is available in ratings up to 10 amp., 600 volts, a.c., and may contain as many as eight poles in any combination of normally open and normally closed contacts. (Not shown.) Vol. 84, p. 850.

CABLE CONNECTOR—*Burndy Engineering Co., 459 E. 133rd St., New York, N. Y.* Type QPX "Versitap" connector may be used as a parallel tap, T-connector, cross connector or end-to-end connector. It will clamp a large range and combination of cable sizes in either the main or branch connection grooves, is installed with an ordinary wrench and is easily taped. Vol. 84, p. 790.

BREAKER INCLOSURE—*Square D Co., Detroit, Mich.* A raintight inclosure for the 25-amp. frame Type MO "Multi-breakeR" is a galvannealed steel hood with cover removable for easy wiring. Outside dimensions are 7 in. high, 4½ in. wide and 3⅞ in. deep. (Not shown.) Vol. 84, p. 644.

PUSHBUTTONS — *General Electric Co., Schenectady, N. Y.* General-purpose one and two button standard duty pushbutton stations offer improvements in operation, appearance, and ease of installation. Inclosures measure 4 $\frac{3}{16}$x-2⅝x2½ in. (Not shown.) Vol. 84, p. 646.



SPEED-VARIATOR—*General Electric Co., Schenectady, N. Y.* This complete a.c. speed-variator provides wide ranges of adjustable speeds by generator voltage control. It consists of an adjustable speed d.c. motor, an adjustable voltage motor-generator set with control, and a separately mounted generator-field rheostat. Standard speed ranges are available up to 16:1 ratio. Vol. 84, p. 553.

MOTOR CONTROL—*General Electric Co., Schenectady, N. Y.* With this synchronous motor control (not shown) the field cannot be applied until the motor has reached a speed at which it can synchronize its load. Undesirable current and torque fluctuations are avoided. Vol. 84, p. 231.

DRUM CONTROL—*Cutler-Hammer, Inc., 205 N. 12th St., Milwaukee, Wis.* This drum type master switch, providing three-wire control, is particularly adaptable to machine tools. It is equivalent to two or three button heavy duty pushbutton stations, and is superior for use when an operating lever is preferred to a button. Rating is for pilot circuits up to 600 volts a.c. and d.c. Vol. 84, p. 786.

CIRCUIT BREAKER — *Cutler-Hammer, Inc., 205 N. 12th St., Milwaukee, Wis.* Type MB "Multibreaker" (not shown) has an insulated groundable neutral. Assemblies are available with from 1 to 16 breakers which can be arranged for 2 or 3 hole solid neutral circuits for a.c. service. Vol. 84, p. 560.

INDICATING LAMPS—*H. R. Kirkland Co., Morristown, N. J.* No. T2 molded plastic unit (not shown) for use in indicating lamp service has an extremely small lens. Constructed to allow a full 180 deg. of light over the lens cap, even under rays of strong exterior light, this unit also incorporates an "Anti-false" color feature. Vol. 84, p. 559.

MIDGET RELAY — *Ward Leonard Electric Co., Mount Vernon, N. Y.* Bulletin 105 midget relay (not shown) for use on either a.c. or d.c. is available with contacts arranged for single pole, normally open, normally closed or double throw. Relay is rated at 1 hp., and is furnished with coils for operation on standard voltages up to 115. Over-all base dimensions are 2⅝ in. x 1⅞ in. Depth is 1½ in. Vol. 84, p. 560.

Electrical Equipment—PARTS and MATERIALS

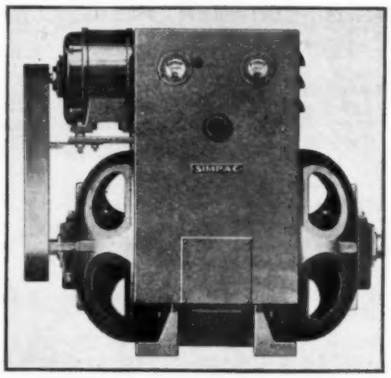
PLUGGING SWITCH—*General Electric Co., Schenectady, N. Y.* Use of an "Alnico" magnet in a plugging switch for controlling motor stopping eliminates frictional parts or clutches and is claimed to contribute to low maintenance costs and long operating life. Vol. 84, p. 266.

LIMIT SWITCH—*General Electric Co., Schenectady, N. Y.* A small geared-type limit switch has been designed for application on motor-driven devices where it is necessary to limit the rotation of the motor shaft or some rotating shaft member on the driven machine, one of the most important applications being on machine tools. Contacts are designed for 125-volt 4-amp. a.c. operation and 125-volt 1-amp. d.c. service. Case measures only $4\frac{11}{16}$ x $3\frac{1}{2}$ x $1\frac{33}{32}$ in. (Not shown.) Vol. 84, p. 784.

SOLDERLESS TERMINAL—*Square D Co., Detroit, Mich.* "Universal Speed Connector" solderless terminal will take from No. 14 to No. 4 wire. Connector is free to rotate around the screw, allowing wire to be inserted from any angle. (Not shown.) Vol. 84, p. 227.

STARTER—*Cutler-Hammer, Inc., 205 N. 12th St., Milwaukee, Wis.* Improved Bulletin 9586 across-the-line starter for polyphase squirrel-cage motors up to 5 hp. features a hook-on cover, easy removal of operating mechanism, improved vertical contacts, and a small overload relay with improved operating characteristics. (Not shown.) Vol. 84, p. 352.

TESTING RECTIFIER—*Mellaphone Corp., Rochester, N. Y.* Model SP-20 rectifier provides d.c. from a.c. for testing, at output voltages of 32, 110, 115, 120, 210, 225 and 240. Current capacity is 30 amp. at 32 volts d.c., and 20 amp. at all other voltages. (Not shown.) Vol. 84, p. 790.



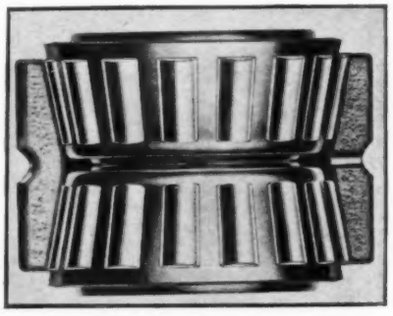
POWER UNIT—*Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa.* "Simpac" completely self-contained a.c. generating unit regulates, controls, and meters its output. It combines a standard open-type a.c. generator, a d.c. exciter, exciter field rheostat, voltmeter, ammeter, and optional voltage regulator in one integral unit. Ratings from 3.75 to 187 kva. are available at voltages of 120/128, 240 or 480, with operating speeds from 600 to 1,800 r.p.m. Vol. 84, p. 783.

CONTACTORS—*Cutler-Hammer, Inc., 315 N. 12th St., Milwaukee, Wis.* No. 540 heavy-duty d.c. contactors (not shown) are available in 100, 150, 300, 600, 1200 and 1800 amp. sizes. They feature high-frequency arc blowout. Vol. 84, p. 272.

INFRA-RED LAMP—*Westinghouse Lamp Div., Bloomfield, N. J.* Four infra-red drying lamps (not shown) in 250 to 1,000 watt sizes for industrial or commercial drying and heating jobs are available. All are for 105 to 120 volt circuits. Vol. 84, p. 272.

PANEL BOARD—*Square D Co., Detroit, Mich.* Type MH "Multi-breakeR" distribution panel board provides circuit breaker protection for power and light distribution circuits of 100 amp., 230 volt capacity. Individual breakers are furnished in 15 to 100 amp. capacity, of 1-, 2- or 3-pole, for 115- and 230-volt single phase and three phase a.c. systems. (Not shown.) Vol. 84, p. 786.

MICRO SWITCH—*Micro Switch Corp., Freeport, Ill.* Die cast micro switch has a roller-type plunger with a brass bushing which accepts the roller either longitudinally or crosswise. Adjustment for actuation by cam or slide in either of two positions is quickly made. Switching element is a small single-pole snap-action switch having a rating of 1,200 watts up to 600 volts a.c. (Not shown.) Vol. 84, p. 783.



SHEAVE BEARING—*Timken Roller Bearing Co., Canton, Ohio.* Type NA non-adjustable roller bearing has been modified to make it especially adaptable as a sheave bearing. Made of a double row outer race and two single row inner races, this bearing has all parts precision ground. Sealing is simplified. Bearing is designed to a minimum width and with an inside diameter large in relation to its outside diameter. Vol. 84, p. 781.

TRANSFORMER—*Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa.* Type ASL air-cooled transformers, claimed to provide a high factor of safety, have 60 cycle ratings from 150 to 500 kva. for single phase and 150 to 1,000 kva. for three phase, at voltages of 13,200 and less. Heat-resisting insulations are used throughout, allowing operation at higher temperatures than permissible with liquid-filled transformers. (Not shown.) Vol. 84, p. 781.

STARTER—*Trumbull Electric Mfg. Co., Plainville, Conn.* A compact starter (not shown) which combines a motor circuit disconnect and a magnetic starter in one unit, for use on motor circuits from 1 to 25 hp., 600 volts, a.c. is arranged for convertible fusing and front operation. Interchangeable heaters are available for the starter, while automatic reset is provided for the disconnects. Vol. 84, p. 403.

PILOT CONTROL—*Photoswitch, Inc., 21 Chestnut St., Cambridge, Mass.* "Pilot Control" electronic switch controls large currents by delicate mechanisms, liquids, or extremely light contact pressures. Control is effected by touching of two fine wires. Only three millionths of an ampere will operate the units. (Not shown.) Vol. 84, p. 403.

CONTACTOR—*Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa.* Series 200, Type SM, improved heavy-duty d.c. magnetic contactor features increased armature overtravel, larger contact tips and nitrided bearings. Blowout coil is brazed to contact support, and heating is reduced. (Not shown.) Vol. 84, p. 395.

BALL BEARING—*New Departure Div., General Motors Corp., Bristol, Conn.* No. TP-13-500 vertical tension pulley bearing contains its own oil circulating system for speeds of 3,500 to 15,000 r.p.m. Bearing is of the self-sealed type with all-metal seals. It requires no lock nuts, screws or other parts. Vol. 84, p. 438.

BALL BEARING—*Stephens-Adamson Mfg. Co., Aurora, Ill.* Extended inner rings are provided in Style A "Sealmaster" ball bearing. For machine application on straight shafts, this bearing employs a centrifugal labyrinth seal. It is available for shaft sizes from $\frac{5}{8}$ to $2\frac{15}{16}$ in. (Not shown.) Vol. 84, p. 998.

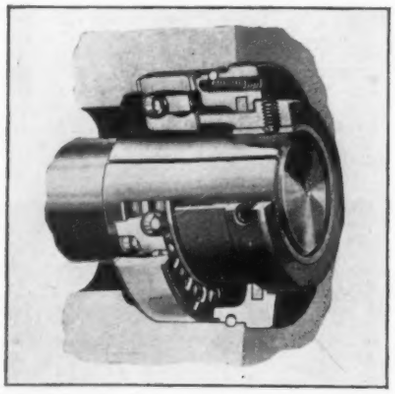
PLUG-IN RELAYS—*Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa.* A line of plug-in relays (not shown) makes it possible to remove the completely assembled relay in its case from the switchboard to a more convenient location for testing, inspection or adjustment. Terminals extend from the rear as bayonet fingers which engage with spring-clip receptacles. Existing relays can be converted to plug-in construction. Vol. 84, p. 484.

CABLE CONNECTOR—*Square D Co., Detroit, Mich.* Designed for use as a solderless connector or solder lug, this cable connector covers a wide range of wire sizes. It has only two parts, a cast lug and a special setscrew. (Not shown.) Vol. 84, p. 484.

HOOK-ON METER—*General Electric Co., Schenectady, N. Y.* With the Type AK-1 portable hook-on volt-ammeter alternating current can be read instantaneously on both insulated and non-insulated conductors simply by hooking the instrument around the line. For voltage readings, it is necessary only to connect two leads and flip the thumb selector switch. Four current ranges, 0-15/60/150/600 amp., and two voltage ranges, 0-150/600 volts, are available. (Not shown.) Vol. 84, p. 786.

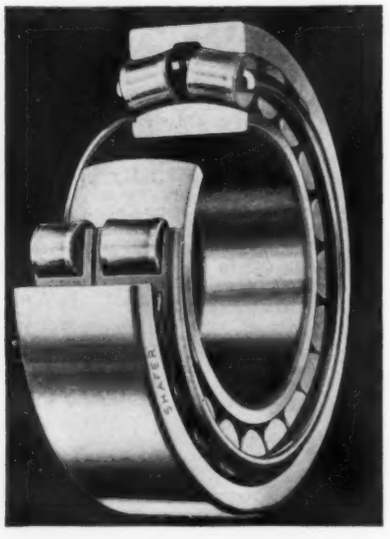
PARTS and MATERIALS—Bearings, Fittings

SINGLE-POLE SWITCH—*Hart Mfg. Co., Hartford, Conn.* A single-pole toggle switch for 10 amp. at 115 volts or 5 amp. at 230 volts a.c. has a "snap-in" mounting. No screws are needed. It is recommended for controlling fractional-horsepower motors, fans, signal systems, lamps, relays, etc. (Not shown.) Vol. 84, p. 352.



BALL BEARINGS—*Ahlberg Bearing Co., 3050 W. 47th St., Chicago, Ill.* To provide a simple means of incorporating ball bearings in equipment where the bearing housing is an integral part of the machine, "CJB" Simplex units are available for light, medium and heavy loads. They can be fitted with either single row, double row or self-aligning bearings. Vol. 84, p. 110.

BEARING—*Bartlett Hayward Div., Koppers Co., Baltimore, Md.* Fast's multiple oil film bearing carries the load on wedge-shaped oil films which prevent metallic contact and wear and eliminate vibration and noise. Films automatically are maintained over the full bearing surface, since each bearing is so designed that it acts as a centrifugal viscous feed pump. Load capacity is said to increase with speed and normally is as great as that of the shaft. (Not shown.) Vol. 84, p. 264.

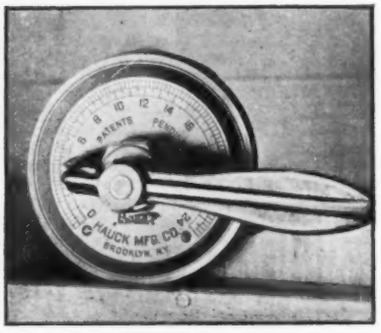


ROLLER BEARINGS—*Shafer Bearing Corp., 35 E. Wacker Drive, Chicago, Ill.* Series DE double row angular contact roller bearings are available in DE-200 series, sizes from 3.1490 to 5.9045 in. bore, and DE-300 series, sizes from 1.9680 to 5.1171 in. bore. Concave rollers provide self-alignment. Vol. 84, p. 230.

VALVE—*Hancock Valve Div., Manning, Maxwell & Moore, Inc., Bridgeport, Conn.* Life of valve seats and disks is claimed to be increased twelvefold by superfinishing on "500 Brinell" valves. (Not shown.) Vol. 84, p. 895.

ROLLER BEARINGS—*Timken Roller Bearing Co., Canton, Ohio.* A new bearing series (not shown) of the standard "SS" type includes No. 9285–9220, with a cone bore of 3 in., outside diameter of 6⅜ in. and width of 1$\frac{13}{16}$ in. At 500 r.p.m., this bearing has a radial capacity of 6,255 lb. and a thrust capacity of 8,710 lb. Nos. 9100, 9300, and 9000 bearings of the "SS" type have also been redesigned to reduce outside diameters and width while maintaining the same load carrying capacities. Cone bores from ¾ to 12½ in. are available. Vol. 84, p. 555.

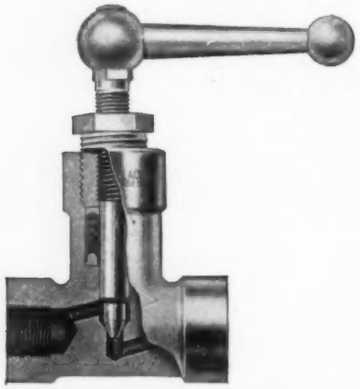
BEARINGS—*Norma-Hoffmann Bearings Corp., Stamford, Conn.* Small bearings (not shown), heretofore available in the full (retainerless) type, can now be obtained with retainers (or ball cages). Vol. 84, p. 267.



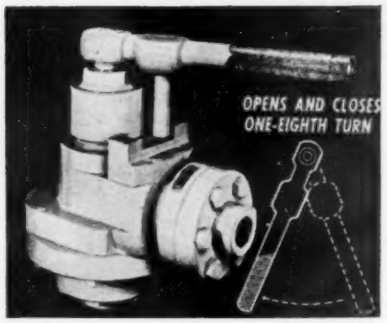
OIL VALVE—*Hauck Mfg. Co., 124 Tenth St., Brooklyn, N. Y.* Flow is directly proportional to slot opening area and to the number on the calibrated dial in the "Micro-Cam" valve for regulating oil flow on any type of burner. Vol. 84, p. 1102.

VALVE—*Reading-Pratt & Cady Div., American Chain & Cable Co., Reading, Pa.* Fig. 531-P bronze globe valve has a full-plug seat and disk, and is designed for throttling service on high-temperature, high-pressure steam lines. It is also suitable for use on lines carrying gritty substances. (Not shown.) Vol. 84, p. 1049.

GAGE GLASS—*Ashcroft Gage Div., Manning, Maxwell & Moore, Inc., Bridgeport, Conn.* "Durafront" plastic gage cover (not shown) eliminates possibility of workers being injured by broken gage glass. Molded of clear plastic having a tensile strength of 5,000 lb. and a compression strength of 15,000 lb., it is available in 3½, 4½ and 6 in. sizes. Vol. 84, p. 600.



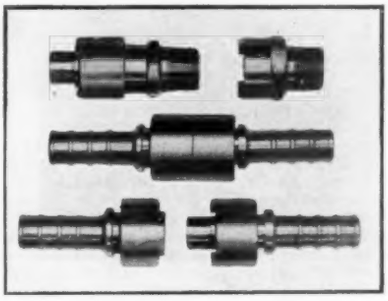
NEEDLE VALVE—*Blackhawk Mfg. Co., 5025 W. Rogers St., Milwaukee, Wis.* "V-8" high-pressure needle valve withstands pressures up to 10,000 lb. per sq.in. It is applicable to hydraulic controls of machine tools and other equipment. It can be used with any fluid not injurious to leather, bronze or stainless steel. Vol. 84, p. 692.



STAINLESS VALVE—*Albright Equipment Co., 590 Crafts Bldg., Pittsburgh, Pa.* "Hydra" stainless steel high-pressure valves may be used on water, steam and oil lines having pressures up to 4,000 lb. per sq.in. They are made in three body types: brass, bronze and steel. Standard sizes range from ½ to 2 in. diameters. Vol. 84, p. 478.

REVOLVING JOINT—*Barco Mfg. Co., 1801 Winnemac Ave., Chicago, Ill.* Revolving-type flexible ball joints supply steam, gas or fluids from a fixed or stationary supply pipe to a rotating drum or other member without leakage. Five standard sizes are available for ½, ¾, 1, 1¼ and 1½ in. pipe. (Not shown.) Vol. 84, p. 230.

"DURAVALVE JUNIOR"—*Hancock Valve Div., Manning, Maxwell & Moore, Inc., Bridgeport, Conn.* "Duravalve Junior" 600-lb. valve has a body and bonnet of carbon molybdenum steel giving it a temperature rating of 950 F. at 600 lb. steam pressure. Stellite seat is integral with body. Valve is available in sizes from ¼ to 1 in., in the globe type, with screw or welding ends. (Not shown.) Vol. 84, p. 480.



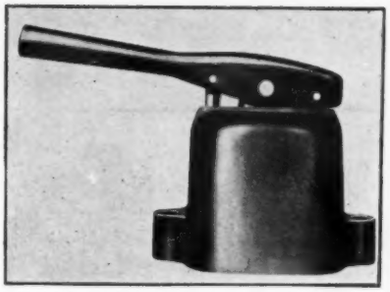
HOSE COUPLING—*Pittsburgh Brass Mfg. Co., 3261 Penn Ave., Pittsburgh, Pa.* "Fuline" quick-operating bronze hose couplings join similar or dissimilar sizes of rubber hose on air, water, steam and gas lines operatitng at 200 lb. pressure. They employ a positive locking device. Standard sizes are ⅜, ½ and ¾ in. Vol. 84, p. 482.

RELAY—*Brown Instrument Co. Div., Minneapolis-Honeywell Regulator Co., Philadelphia, Pa.* Protection against failure of oil, powdered coal, and other luminous gas flames is provided by "Protectoglo Photo-Electrode" system. (Not shown.) Vol. 84, p. 1044.

ROLLER CHAIN—*Diamond Chain & Mfg. Co., Indianapolis, Ind.* Weighing only 1¾ oz. per ft., No. 88 roller chain performs in services for which other roller chains are too heavy or bulky. Rollers are 0.197 in. in diameter and 0.125 in. in width. Chain averages 1100 lb. ultimate strength. (Not shown.) Vol. 84, p. 1040.

INSULATING JOINT—*Hanson-Van Winkle-Munning Co., Matawan, N. J.* An improved hose-type insulating steam joint (not shown) consists of a special seamless rubber tube, compounded to resist steam and heat, covered with plies of closely woven duck. Between these plies are placed layers of insulating rubber. A heavy cover is applied on the outside of the joint. Each joint is 8 in. long and is built to stand 100 lb. steam pressure. Vol. 84, p. 558.

Parts, Processes—PARTS and MATERIALS

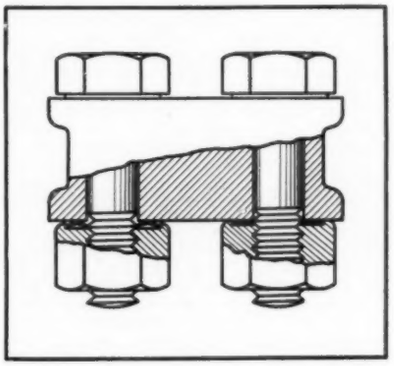


VALVE—*C. B. Hunt & Son, 1851 E. Pershing St., Salem, Ohio.* This double four-way hand-operated air valve controls two individual double-acting air cylinders. Vol. 84, p. 895.

OILER—*Trico Fuse Mfg. Co., 2948 N. 5th St., Milwaukee, Wis.* A visible unbreakable wick-feed oiler (not shown) is for machinery which operates intermittently. Lever at the top, when in a vertical position, starts the feed, and when flipped to the side, shuts off the feed, preventing flooding. Oilers are available in 1, 2, and 4 oz. capacities. Vol. 84, p. 594.

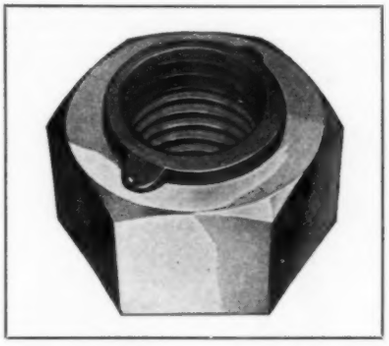
CAM BLANKS—*Synthane Corp., Oaks, Pa.* "Synthane" cam blanks for Brown & Sharpe automatic screw machines make possible production of a complete set of cams in less time than formerly required. All blanks have center hole bored, pin hole drilled, and radial lines scribed for ease of layout. Vol. 84, p. 690.

WELDING PARTS—*Ohio Nut & Bolt Co., 600 Front St., Berea, Ohio.* Rectangular welding nuts, rectangular welding bosses and welding brackets (not shown) are available. They are made of the same material as the part to which they are to be resistance welded. They have tapped holes in one or both legs, or with drilled or reamed holes that serve as bearings for push rods or revolving shafts. Vol. 84, p. 485.



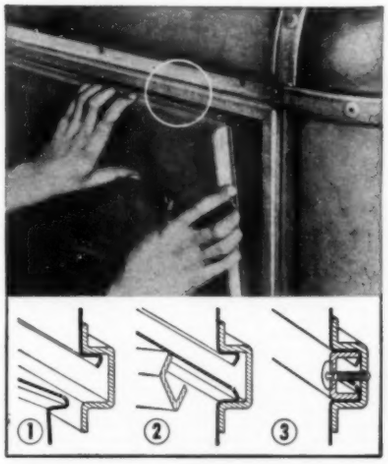
LOCK NUT—*An-Cor-Lox Div., Laminated Shim Co., 64 Union St., Glenbrook, Conn.* "An-Cor-Lox" nut locks to the bolt instead of to the work. Metal locking ring at the bottom of the nut is expanded into the root of the bolt thread and against the nut rim. It holds securely under all conditions of heat and vibration. Nut is claimed not to damage bolt thread nor to mar work surface. Vol. 84, p. 598.

LOCK WASHER—*Mechanical Laboratories, Inc., 128–130 Latham St., Pittsburgh, Pa.* "Pre-Fixed" lock washer is assembled to a standard threaded fastener before leaving the factory by a simple press operation. (Not shown.) Vol. 84, p. 1000.



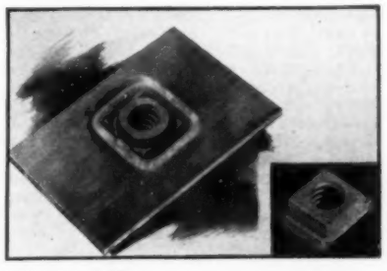
LOCK NUT—*Security Metal Products, Inc., 362 E. Kalamazoo Ave., Kalamazoo, Mich.* "Security" lock nut, claimed to permit tightening up or backing off years after application without loosening its grip, utilizes a slightly elliptical spring-steel retainer permanently seated in the head of a standard nut. Vol. 84, p. 898.

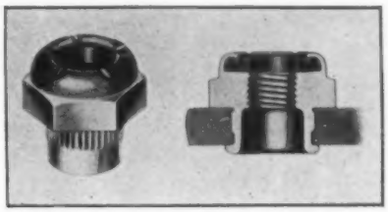
LOCK NUT—*Elastic Stop Nut Corp., 1015 Newark Ave., Elizabeth, N. J.* Nine new types of lock nuts (not shown) embodying the basic elastic stop self-locking element are available. Vol. 84, p. 38.



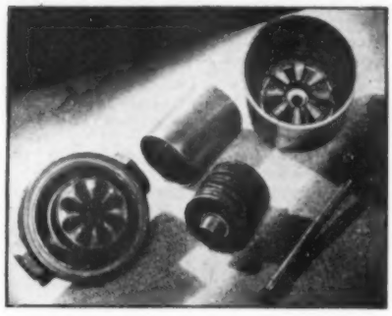
SHEET-FRAME STRUCTURE—*Dry-Zero Corp., Chicago, Ill.* Fabricated to within ½ in. of any desired dimension, Lindsay Structure materials make possible increased strength without increased weight. Sheets are pulled into tension between the framing members. Vol. 84, p. 226.

LOCK NUTS—*FabriSteel Products, Inc., Kerr Machinery Bldg., Detroit, Mich.* Punched out of a drawn flanged section, "Fast-on" lock nuts increase thread area in sheet metal, making practical the use of lighter gage metals and simplifying assembly in accessible places. Over 30 types are available in sizes from No. 6 to ⅜ in. Vol. 84, p. 446.



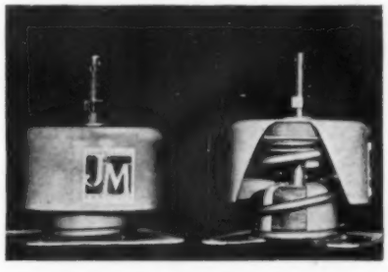


CLINCH NUT—*Elastic Stop Nut Corp., 2332 Vauxhall Rd., Union, N. J.* Fastening sheet-metal assemblies in which parts must be readily removed and returned to position is aided by this clinch type self-locking nut with knurled shank. Screw may be removed and replaced repeatedly without loss of locking action. Vol. 84, p. 1046.



OIL CLEANER—*S. G. Frantz Co., 161 Grand St., New York, N. Y.* "Ferro-Filter" cleaner for lubricating and hydraulic oil systems uses permanent magnets to extract minute iron particles, which are held either on the magnets themselves or on a large magnetized grid area. Cleaning is accomplished by disassembling and washing in kerosene. Vol. 84, p. 946.

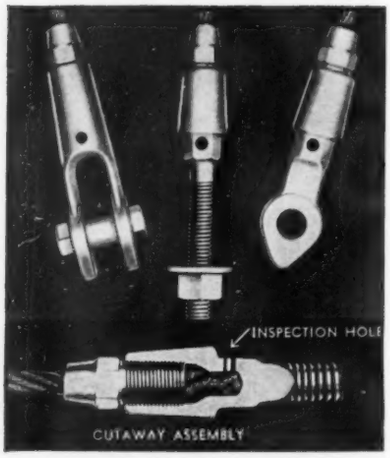
SILVER PLATING PROCESS—*Rapid Electroplating Process, 1414 S. Wabash Ave., Chicago, Ill.* A process (not shown) by which silver platings 0.0002 to 0.001 in. thick can be applied economically consists of an improved undercoat with superior wetting qualities and an improved plating compound. Current is applied by a transformer-rectifier or dry batteries. Vol. 84, p. 447.



VIBRATION ISOLATOR — *Johns-Manville, 22 E. 40th St., New York, N. Y.* Designed to control machine vibration and reduce noise, J-M controlled-spring isolator consists of a coil spring, a rubber load pad, and an adjustable rubber snubber inside the base. It is made in two sizes: light-duty, for loads from 60 to 90 lb. per isolator; and heavy-duty, for loads from 250 to 720 lb. per isolator. Vol. 84, p. 267.

BRASS PLATING PROCESS—*Electroplating Div., E. I. du Pont de Nemours & Co., Wilmington, Del.* A brass plating process (not shown) two to four times as fast as previous processes yields smooth, bright deposits of controllable thicknesses. Use is made of prepared high-speed brass salts to provide simple, quick preparation of a new bath, which plates immediately, eliminating the "breaking in" period. Process operates without polarization at high anode current densities. Vol. 84, p. 950.

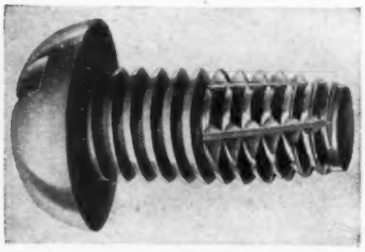
PARTS and MATERIALS—Processes, Materials



WIRE ROPE CONNECTOR—*Electroline Co., 4054 S. LaSalle St., Chicago, Ill.* Improved "Electroline-Fiege" connectors damp line vibration and grip the cable with a graduated compression, preventing crystallization at the point of connection and thus promoting longer rope life. Installation is made with ordinary tools. These connectors are available in black, hot galvanized and cadmium plated steel; and in bronze, stainless steel and Monel metal for rope sizes under ½ in. Vol. 84, p. 782.

"PLURAMELT" PROCESS — *Allegheny Ludlum Steel Corp., Oliver Bldg., Pittsburgh, Pa.* "Pluramelt" steel making process (not shown) makes possible production of steel ingots of more than one composition from which can be rolled sheets and plates having a thin cladding of stainless steel inseparably bonded to a thick layer of low-carbon steel. Vol. 84, p. 153.

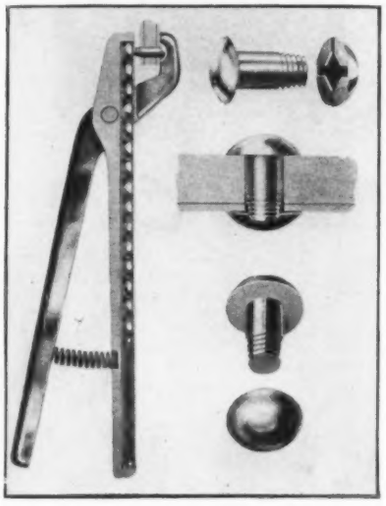
RUBBER BONDING PROCESS — *Hewitt Rubber Corp., Buffalo, N. Y.* "Dura-Bond" method (not shown) for bonding soft rubber and Neoprene to steel and aluminum by hot vulcanization is said to result in an adhesion strength of 500 to 700 lb. per sq.in. with good aging qualities. Vol. 84, p. 110.



SELF-TAPPING SCREW—*Parker-Kalon Corp., 200 Varick St., New York, N. Y.* Type F self-tapping screw is for use in materials of a crumbling or granular nature, such as cast and malleable iron. Its tap-fluted pilot makes it capable of truly cutting a thread. This thread fits a standard machine screw. A standard nut also fits the self-tapping screw. Vol. 84, p. 804.

SPRING WIRE — *Jones & Laughlin Steel Corp., Pittsburgh, Pa.* "Electromatic" oil tempered wire (not shown) for special mechanical springs is being produced by direct electric resistance method. Process consists of passing sufficient current through the wire to heat it. Equipment handles a wide variety of gages, and is so constructed that wire fed from reels passes first through tension rollers, then through a molten electrical contact. From there, the wire passes through a second molten contact, completing the circuit and serving as a primary quenching bath from which the wire immediately passes to an oil bath for final quench. Vol. 84, p. 789.

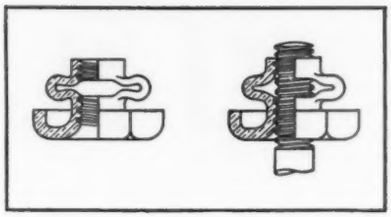
SCALE-PREVENTION PROCESS — *Metallizing Engineering Co., 21-07 41st Ave., Long Island City, N. Y.* "Metcolizing" process (not shown) protects iron and steel, and in some cases copper and bronze, against oxidation and scaling at elevated temperatures. It also is recommended for protecting nickel and nickel-chrome alloys against attack by sulphurous gases. Process includes application of Metco H. P. aluminum, application of "Metcoseal" liquid, and heat-treatment. Vol. 84, p. 268.



SPRING FASTENER—*Hopkan Rivet Co., 128-130 Latham St., Pittsburgh, Pa.* An improved fastener with a spring locking button is used in the same manner as speed nuts and screws. It presents a finished appearance in exposed places. Button and fastener are so designed that they will not loosen from vibration. They can be made from any type of alloy. Vol. 84, p. 554.

SHIM STOCK—*Laminated Shim Co., Glenbrook, Conn.* Thin laminated shim stock (not shown) supplied in slotted cartons is marked on its edge, from 0 to 100 in., with half-inch subdivisions. These packaged rolls of 6-in. wide brass or steel shim stock are available in thicknesses of 0.001 to 0.015 in. Vol. 84, p. 51.

"FORGE-WELDING" — *Progressive Welder Co., 3001 E. Outer Drive, Detroit, Mich.* "Forge-Welding" heavy-duty electric resistance welding joins heavy ferrous sections heretofore considered impossible to weld with conventional equipment. Process consists of first applying pressure to the work, then an interrupted current, and finally superimposing a hammering action on the electrode. Spot size varies according to metal and thickness. On work totaling 1½ in. thick the spot is about 1 in. in diameter. Vol. 84, p. 799.



LOCK NUT—*Scovill Mfg. Co., Waterbury, Conn.* A vibration-resisting, self-locking nut of the wing style presents all advantages of the solid type, but is 10 to 50 per cent lighter. It is fabricated from steel and cadmium plated. Present sizes run from No. 6 through ¼ in. Vol. 84, p. 1040.

PLASTIC—*Durez Plastics & Chemicals, Inc., Walck Rd., North Tonawanda, N. Y.* Durez "1905 Black" phenolic molding compound (not shown) has impact strength of 0.6 (A.S.T.M.) and heat-resistance of 418 F. Unusually high gloss for high-impact compounds is claimed. Vol. 84, p. 404.

HIGH-STRENGTH ALLOY — *Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa.* "K-42-B" alloy (not shown) is claimed to be stronger than any steel. Containing only 7 per cent iron, it will retain its strength at temperatures higher than 2,000 F. It is stronger at 1,100 F. than ordinary low-carbon steel at room temperature. It has a low damping coefficient, and very little creep. Vol. 84, p. 316.

MOLDING COMPOUND — *Durez Plastics & Chemicals, Inc., North Tonawanda, N. Y.* "Durez 8685" phenolic molding compound (not shown) was formulated specifically to prevent tracking where there is combined electrical spark and rubbing action. It has high resistance to carbonization. It is somewhat more flexible in its final set than standard materials, and does not crack under expansion and contraction of metal inserts. Vol. 84, p. 51.

AIRCRAFT WIRE—*Appliance & Merchandise Dept., General Electric Co., Bridgeport, Conn.* "Deltabeston" lightweight small diameter aircraft wire (not shown) can be used for storage battery leads, circuit wiring for lamps, instrument wiring and similar applications. It is flame-proof, highly resistant to heat, oil and moisture, and is available in sizes from No. 22 to 2/0. Vol. 84, p. 902.

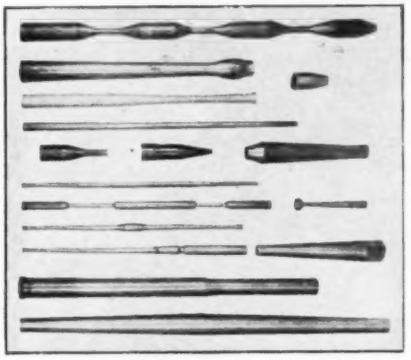
SINTERING MATERIAL — *Charles Hardy, Inc., 415 Lexington Ave., New York, N. Y.* "Sinterloy" powder (not shown) may be pressed into any desired form by accepted methods of power metallurgy and when sintered will result in a steel. It comes in three compositions for production of steel having carbon content of approximately 0.15, 0.40 and 0.80 per cent. It is claimed suitable for gears, cams, pump rotors, washers, pins and rivets. It may be heat-treated, pack-hardened, and tempered like ordinary steel. Vol. 84, p. 188.

PLATED ALUMINUM SHEETS—*Nickeloid Co., Peru, Ill.* Combining the durability of nickel and chromium with the lightness, strength and workability of aluminum, nickel-aluminum and chrome-aluminum plated metals (not shown) are formed by a surface of chromium or nickel bonded by an electrolytic process to an aluminum base metal, using the "Krome Alume" process. Vol. 84, p. 115.

PLASTIC — *Durez Plastics & Chemicals, Inc., North Tonawanda, N. Y.* Durez "1900 Black" (not shown) is an easily preformed high-impact phenolic plastic. It is said to deliver an unusually smooth finish. Vol. 84, p. 153.

ETHYL POLYCHLOROBENZENE—*E. I. duPont de Nemours & Co., Wilmington, Del.* Ethyl polychlorobenzene (not shown) is claimed to be a highly stable liquid, suitable as a heat transfer fluid, a dielectric for electric condensers, fluid for pressure control mechanisms, and as a non-flammable lubricant. Vol. 84, p. 76.

CEMENTS—*B. F. Goodrich Co., Akron, Ohio.* "Vulcalock" cements (not shown) permit strong, waterproof, chemically resistant joints between rubber and metals. They also join a wide variety of other materials, including many synthetic resins, woods and ceramics. Strength of bond ranges from 10 to 500 lb. per sq.in. Vol. 84, p. 38.



TAPERED TUBING—*Steel & Tubes Div., Republic Steel Corp., Cleveland, Ohio.* Tubing with tapers up to 20 ft. long or with any combination of tapers and curves in the same length, with reductions in diameter up to 50 per cent, are possible with the Dewey tube-forming process. Process handles tubing as heavy as No. 8 gage up to 4 in. in diameter. When forming 2-in. tubing, wall thickness ranges from 20 to 10 gage. Reduction may be 60 per cent of the original diameter. Either welded or seamless tubing can be handled. Vol. 84, p. 1109.

PLASTIC—*Durez Plastics & Chemicals, Inc., North Tonawanda, N. Y.* "Durez 1910" high-impact phenolic molding compound (not shown) is the third in a series of "1900" compounds having a particle size making it convenient to handle in hoppers and feeders. Containing graphite, this material was developed especially for such applications as bumper shoes, refrigerator lock bolts and other parts where minimum frictional resistance is desirable. Specific gravity is 1.45. Bulk factor is 3.6:1. Vol. 84, p. 1109.

ALLOYING AGENTS — *Vanadium Corp. of America, 420 Lexington Ave., New York, N. Y.* "Grainal" alloys (not shown) assist the steelmaker in meeting more easily close specifications required by automotive, armament, machinery and other industries. Vol. 84, p. 952.

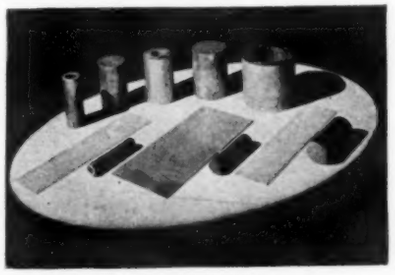
FREE MACHINING STEELS — *Union Drawn Steel Div., Republic Steel Corp., Cleveland, Ohio.* A Bessemer screw steel and an open-hearth screw steel (not shown) are claimed to be superior in machining qualities to the finest and fastest screw steels previously available, and to be superior in soundness and freedom from machinability variations. "Maxcut" has physical properties comparable to S.A.E. X1112. Parts show a smooth fine finish when machined at 280 ft. per min. with a feed of 0.0095 in., giving an average tool life of more than eleven hours. "Multicut" open-hearth steel has physical properties similar to those of S.A.E. 1115. Parts show a fine finish when machined at 275 ft. per min. with a feed of 0.0087 in., giving an average tool life of better than eight hours. Vol. 84, p. 601.

NON-MAGNETIC STEEL—*Jessop Steel Co., 595 Green St., Washington, Pa.* A non-magnetic free machining alloy steel possesses low magnetic permeability with superior mechanical properties. In the annealed condition, this steel has a tensile strength of 80,000 to 110,000 lb. per sq.in., a yield point of 35,000 to 60,000 lb. per sq.in., 2-in. elongation of 25–50 per cent, reduction of area of 30–60 per cent, and Izod impact value at room temperature of 80 ft.-lb. (Not shown.) Vol. 84, p. 648.

STAINLESS STEEL—*Chemical Foundation, Inc., 654 Madison Ave., New York, N. Y.* This 18-8 stainless steel alloy (not shown) developed at Massachusetts Institute of Technology contains minute quantities of silver to minimize pit corrosion and reduce work hardening. Alloy is said to be especially suitable for drawing or spinning. Vol. 84, p. 38.

MAGNETIC ALLOY—*Bell Telephone Laboratories, New York, N. Y.* "Vicalloy" magnetic alloy (not shown) can hold more permanent magnetism than any commercial material. In addition, it can be drawn and rolled. It is composed of 6 to 16 per cent vanadium, 30 to 52 per cent iron, and 36 to 62 per cent cobalt. It is heat-treated to develop its magnetic qualities. Vol. 84, p. 560.

SOLDER—*Wayne Chemical Products Co., 9450 Copeland St., Detroit, Mich.* "Meltomatic" self-cleaning and self-fluxing paste solder simplifies soldering and tinning. All that is needed is a brush and a heat source. Paste melts at about 400 F. (Not shown.) Vol. 84, p. 36.



BEARING METAL—*Amplex Div., Chrysler Corp., 6500 Harper Ave., Detroit, Mich.* "Oilite" self-lubricating bearing material is available in cored and solid bar stock as well as plate and sheet stock. Cored bars 6½ in. long are made in various inside and outside diameters. Sufficient material is left on both surfaces to allow for machining, which is done easily following usual procedure. This material is an oil cushion bronze thoroughly impregnated with lubricant to the extent of 35 per cent by volume. Vol. 84, p. 790.

AIRCRAFT STEELS—*Jessop Steel Co., 595 Green St., Washington, Pa.* Special alloy steels (not shown) for aircraft include heat-treated and cold-drawn annealed bar products. S. A. E. steels of various alloy series, such as 2300, X4130, and 4340, are supplied in bar form to meet the physical requirements for such parts as bolts, U-bolts, studs and other stressed members. They are available in all principal analyses. Vol. 84, p. 1050.

ALUMINUM ALLOY — *National Bronze & Aluminum Foundry Co., E. 88th & Laisy Ave., Cleveland, Ohio.* Exceptional physical properties are claimed for "T-1" aluminum alloy (not shown). Tensile strength up to 33,000 lb. per sq.in. without heat-treatment, good machineability, and ability to be welded without loss of physical properties are claimed. Percentages of ingredients are approximately as follows: copper, 2.0; tin, 1.5; magnesium, 0.7; zinc, 1.0; titanium, 0.2; chromium, 0.2; balance aluminum. Vol. 84, p. 740.

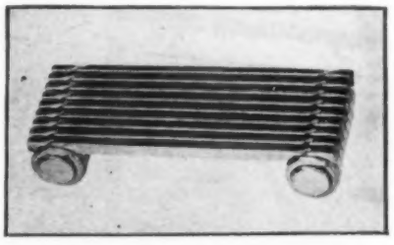
IRON POWDER—*Metals Refining Co. Div., Glidden Co., Hammond, Ind.* This iron powder (not shown) is claimed to be the equivalent of Swedish iron powder. Vol. 84, p. 851.

HIGH-TEMPERATURE ALLOY—*Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa.* "K-42B" alloy (not shown), though containing only 7 per cent iron, is claimed to be stronger than any known steel and to retain its strength at temperatures over 2,000 F. Almost half of it is nickel; about a quarter is cobalt. Other components include chromium, titanium and iron. The alloy creeps very little. Vol. 84, p. 805.

WEAR-RESISTANT STEEL—*Jos. T. Ryerson & Son, Inc., 16th & Rockwell Sts., Chicago, Ill.* "Manganal," a tough, austenetic non-magnetic steel alloy (not shown), combines abrasion-resistant properties with weldability without subsequent heat-treatment. This alloy contains from 11 to 13½ per cent manganese and 3½ per cent nickel. Thicknesses up to ½ in. can be sheared. Plates can be flame-cut, requiring no subsequent treatment when formed or punched hot. Physical properties include a tensile strength of 140,000–150,000 lb. per sq.in.; elastic limit of 55,000–60,000 lb. per sq.in., elongation in 2 in. of 72½ per cent; and a reduction of area of 54 per cent. Vol. 84, p. 51.

BEARING METAL—*Wrought Bearing Metals, Inc., 230 Park Ave., New York, N. Y.* "Caro-bronze" hard drawn bearing alloy (not shown) is said to provide higher strength, greater wear resistance and better machinability than ordinary cast bronzes. Further advantages are claimed to include better sliding properties, higher impact strength, and complete freedom from inclusions, porosity and blow holes. It contains 91.2 per cent electrolytic copper, 8.5 per cent pure tin, and 0.3 per cent phosphorous. Tubing sizes are available from ¼ to 3½ in. in outside diameter, and rods can be supplied in all sizes from wire up to bars about 3½ in. in diameter. Sheet and strip are also available. Vol. 84, p. 952.

BEARING METAL—*Federal Mogul Corp., Shoemaker & Lillibridge Sts., Detroit, Mich.* "Bermax" alloy (not shown) for automotive and other industries offers savings, produces greater efficiency and overcomes corrosion. It is easy to use, cast, and handle in rebabbitting. Vol. 84, p. 693.



WEDGE WIRE—*Wedge Wire Corp., 5200 Harvard Ave., Cleveland, Ohio.* Wedge Wire—wedge-shaped or undercut bars formed integral with solid heavy loops spaced at definite intervals—formerly available only from Europe, is being made in the United States. Standard apertures are .01, 0.02, 0.03 and 0.04 in. It can be made of most metals. Vol. 84, p. 950.

STEEL—*Speed Case Plate Div., W. J. Holliday & Co., Hammond, Ind.* "Speed Case" low-carbon open hearth free machining steel plate (not shown) can be machined without tearing and without cutting oils. It is ductile and resistant to impact and abrasion. Physical properties include tensile strength up to 72,000 lb. per sq.in. Plate 4 in. thick shows Brinell hardness from 141 to 156. Vol. 84, p. 1051.

BEARINGS FOR EVERY APPLICATION
BEARING SERVICE FOR EVERYBODY...

AIR CRAFT

AUTOMOTIVE VEHICLES

MACHINE TOOLS

ELECTRIC MOTORS

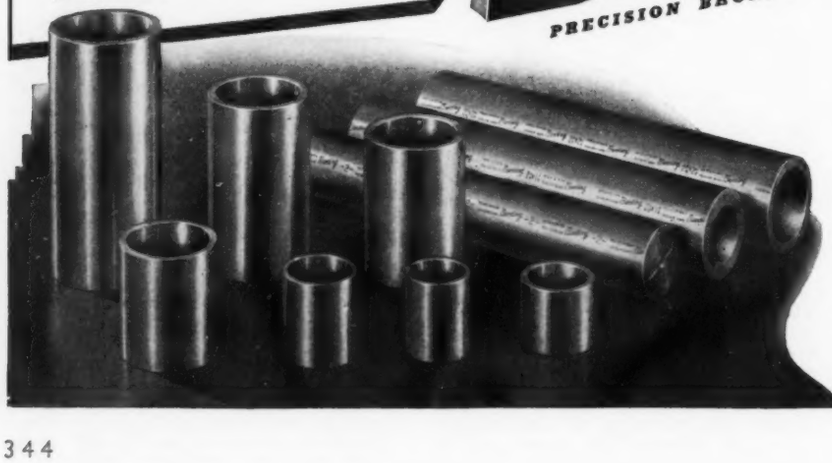
INDUSTRIAL MACHINERY

BEARING METALS

NINE times out of ten the cast bronze bearings you need for production and maintenance of industrial machinery and electric motors are already made, completely machined and finished, awaiting your order. These bearings are carried in stock constantly in hundreds of different sizes, and for electric motors of all makes from 1/50 hp to 100 hp. They are instantly available in any quantity from local wholesalers. Write for catalog of these Standardized Bearings and Tubular and Solid Bearing Bronze Bars . . . The Bunting Brass & Bronze Company, Toledo, Ohio. Warehouses in All Principal Cities.

BUNTING

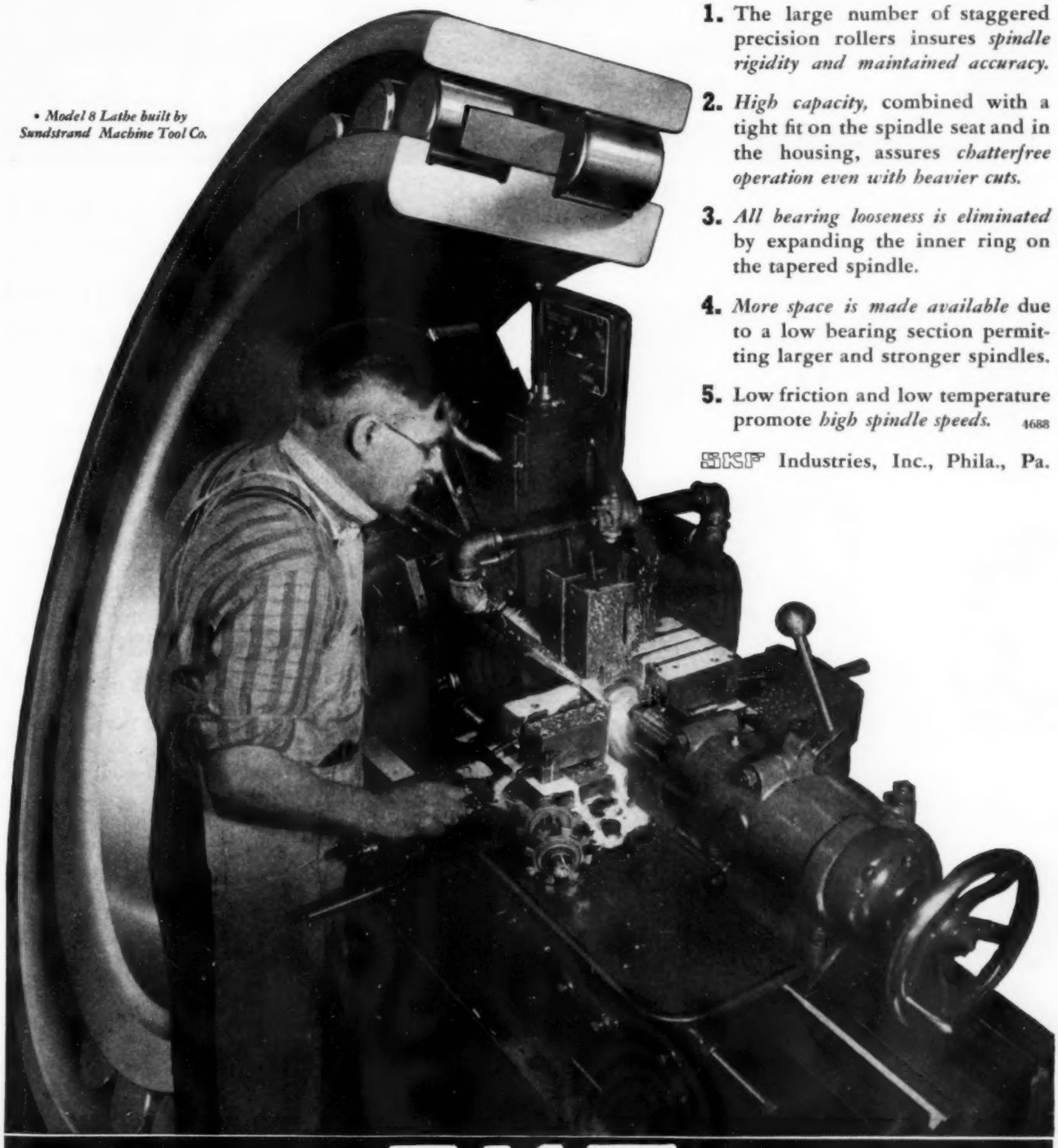
BRONZE BUSHINGS • BEARINGS
PRECISION BRONZE BARS • BABBITT METALS



● This organization stands ready to assist you in research, design, engineering and production of bronze bearings required for special or difficult installations. Our vast experience and comprehensive facilities are at your disposal without cost or obligation.

SMOOTH ACTION IS CERTAIN WITH SKF BEARINGS

because



• *Model 8 Lathe built by Sundstrand Machine Tool Co.*

1. The large number of staggered precision rollers insures *spindle rigidity and maintained accuracy.*
2. *High capacity,* combined with a tight fit on the spindle seat and in the housing, assures *chatterfree operation even with heavier cuts.*
3. *All bearing looseness is eliminated* by expanding the inner ring on the tapered spindle.
4. *More space is made available* due to a low bearing section permitting larger and stronger spindles.
5. Low friction and low temperature promote *high spindle speeds.* 4688

SKF Industries, Inc., Phila., Pa.

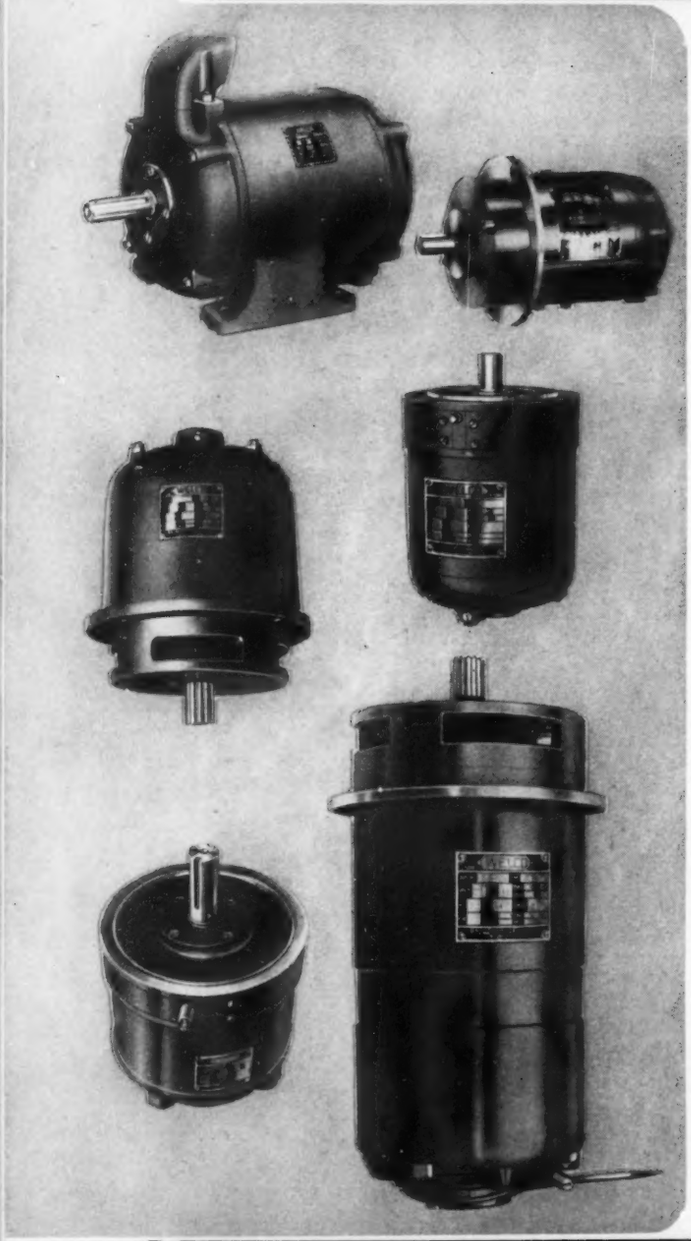
BALL BEARINGS **SKF** ROLLER BEARINGS

MODERNIZE

YOUR *NEW* AND EXISTING MACHINE TOOLS WITH

WELCO

TORQUE MOTORS



THEY ELIMINATE MANY TIME CONSUMING MOTIONS, ALLOW YOU TO MORE THAN KEEP UP WITH INCREASED PRODUCTION SCHEDULES!!

In keeping with the enforced speed of today's production schedules, the B.A. Wesche Electric Co. offers the latest in modern power . . . torque motors that are the maximum in speed and efficiency . . . for the many auxiliary motions found in up to date machine tools.

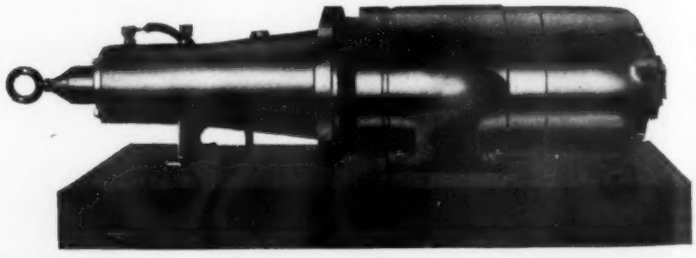
WELCO motors not only provide power where needed, but through their versatility, eliminate many time consuming motions such as clamping, indexing, raising and lowering, etc.

Other prominent advantages of WELCO motors are built-in facility, simple design, low original cost and good appearance. You can modernize existing equipment with these motors, or incorporate them into new units . . . to provide power in particular spots.

Let our engineers discuss the advantages of WELCO equipment with you . . . you'll find them more than willing to assist you in keeping up with ever increasing production schedules. Write us for details today!!

★

HERE'S THE LATEST WELCO DEVELOPMENT . . . A REVOLUTIONARY TORQUE MOTOR THAT TRANSLATES CIRCULAR MOTION INTO STRAIGHT PUSH and PULL DRIVE!



THE B. A. WESCHE ELECTRIC CO.

1626 VINE ST. CINCINNATI, OHIO

GAGING BUSINESS

Machine tool production may reach $700,000,000 in 1941 for a new annual record. RFC makes $350,000,000 available for defense plants. Steel near 100 per cent capacity. New shipyards contract

Machine Tools—Efforts are being made by defense officials to find out what the specific near-term requirements of the Army, Navy and private defense contractors will be for machine tools. The industry thus far has sought such a "blueprint" without success, partly because the program was in such a state of flux that a blueprint could not be produced. Meanwhile builders are continuing to expand their operations at such a rate that total production during 1941 may easily touch $700,000,000 and may go beyond that. Heretofore the maximum was set at $650,000,000, which is $150,000,000 more than ever before done by the industry. Defense business, which first stimulated machine tool orders in huge quantities along the Atlantic seaboard, has spread to the middle west and the Chicago district in particular is feeling the impetus. Some Chicago machine tool dealers, despite long deliveries, have been doing the biggest business in their history. Unusually large orders have also been placed recently in the Pittsburgh district. Hudson Motor Car is starting to award machine tool contracts for its navy work. This week or next Studebaker is expected to order a large quantity of machine tools for manufacture of the Wright airplane motor.

Recent changes in priority ratings, breaking down A-1 ratings into subdivisions, have helped clarify some of the confusion about the ranking of defense orders. Public schools are attempting to secure considerable equipment for defense training program, but it is doubtful whether the delivery date of June 1 can be met in many cases. Britain is trying desperately to find ways and means of increasing its volume of machines to be secured from the United States this year. There is no intention on the part of the British to alter the policy of sending the bulk of the machine tools bought here to England for installation, there, despite the risk of bombings and sinkings.

Munitions—Money being spent for defense is underestimated because congressional appropriations aren't the only source of funds. The R.F.C., for example, has made available around $350,000,000 for defense plants and allied activities. Many sections of the country have not benefited much as yet from the defense program, and political pressure is being used in Washington to remedy that weakness. The War Department will take steps similar to that of putting a small arms plant at Denver so as better to distribute the work.

Steel—Ingot operations, at 98 per cent, are practically up against the ceiling. Almost all mills are sold up through the first quarter. Controversy still waxes warm over the industry's ability to fill defense needs unless substantial increases are made to steel-making facilities. The main uncertainty continues to be the tonnage of steel which Britain will require.

Railroad Equipment — Builders now have on their books close to a billion dollars worth of defense orders. That is more than was spent on materials and equipment, exclusive of fuel, by the railroads during 1940. The Pennsylvania started off the year with a $17,500,000 order to its own shops for work to include 4,500 freight cars. Pacific Fruit Express has contracted for 1,000 new refrigerator cars and plans to spend $11,000,000 to rebuild and repair 3,000 cars. South African Railways are inquiring for 1,000 gondola cars.

Farm Implements—Total farm equipment sales, including export, for 1940 are estimated at $550,000,000, or slightly under the 1936 figure. Current operations are around eight per cent better than a year ago. The 1941 total may be as high as 15 to 20 per cent above last year's. International Harvester is reported faced with strike troubles by the C.I.O. at its six plants, the union demanding replacment of piece work by hourly rates.

Shipbuilding—The program of building 200 cargo ships for the British is being carried out with unprecedented speed. Shipyards will be built at Los Angeles, Houston (Texas) and Portland (Oregon) to help expedite the work. The construction is being spread geographically to interfere as little as possible with the Maritime Commission's C-Ship program and with the Navy's program. If the war continues, the cargo-ship scheme will be as vast as in 1918.

Aircraft—The engine bottleneck probably will get worse before it improves because the pick-up in air frame production soon will far outrun that in motors. Latest estimates of airplane output are a 1,000-a-month rate in February, 1,500 in May, 2,000 in August and 2,400 by the year's end.

OPM TO ASK SIX-DAY WEEK

WASHINGTON — The newly created Office of Production Management will probably ask for a six-day week soon. Observers indicate that industry will be urged to pay time-and-a-half for overtime after 40 hours to enable a speed-up of the defense program. For some time such an appeal has been in the mind of William Knudsen, director general of OPM. An early agreement between him, Sidney Hillman, and Secretaries Knox and Stimson is predicted.

Speed Up Production Of Machine Tools For 1941

WASHINGTON — Plans for further speeding up machine tool output to an extent beyond increases already announced for 1941 have been formulated by members of the National Machine Tool Builders' Association, at a meeting here.

V. V. Geier, president of the association, stated at the conclusion of the meeting that December production passed all previous monthly records and that totals would continue to mount month by month during 1941.

"On December 27," Mr. Geier said, "the industry sent a letter to Mr. Knudsen advising him that it could be expected to turn out machine tools to the value of $650,000,000 in 1941. Today we called upon our members to speed up deliveries even further.

"Members of the industry have pledged themselves to increase production beyond the previous promise to Mr. Knudsen and look to the following methods for accomplishing the result:

"(1) Subcontracting more work to outside concerns: This will bring still more of the country's facilities into prompt production for more machine tools.

"(2) Employing and training more men: The industry has proved its ability to train new men extensively, and will expand this program.

"(3) Further plant expansion as indicated by specific needs.

"(4) Maximum utilization of plants and equipment.

"In his New York speech before the National Association of Manufacturers, Mr. Knudsen said our industry "has set a very good example of speeding up" and this program is in line with our effort to 'do the impossible again.'"

"Our industry is fully aware of the difficulties of determining defense requirements for machine tools. We have considered it our duty in the past to point out that the nation's defense job cannot be done effectively unless we are given definite information as to requirements, so that we shall know what is needed, when it is needed, and where it is needed, in the order of critical importance."

BIG CHANGE IN ADMINISTRATION OF PRIORITIES

Abolish old Priorities Board and substitute a Division of Priorities, headed by Stettinius, as part of the Office of Production Management. Voluntary ratings for sub-contracts

WASHINGTON—Technical organization of the new centralized defense setup is gradually being worked into shape. Top body is the office of Production Management headed by its four-man board. The President deliberately avoided setting up clear lines of authority within the board; he says Knudsen and Hillman will work together like partners in a law firm. Maybe they will; they are known to get along together better than might be expected.

OPM absorbs the two working divisions of the old Defense Commission —production and raw materials. Both are combined into a Division of Production within the OPM. This division is headed by John D. Biggers, who was formerly deputy to Knudsen in the Defense Commission. William L. Batt who, as head of the mineral products section was number two man in the Raw Materials Division, is deputy to Biggers. Staffs of the two old divisions presumably go over substantially in toto to the new body.

Nelson Can Tell Them Now

Within OPM are two other divisions —purchases and priorities. The Division of Purchases, headed by Donald Nelson, is substantially the same thing as the former office of the coordinator of purchases. The significant difference is that where formerly Nelson could advise War and Navy of the best way of buying, now he can tell them. Nelson won't have a great deal to do with the metal-working industry, since he is primarily concerned with fields, such as clothing, where the problem is not one of production but of buying large quantities without disturbing the market.

The most drastic change is in priorities. The old Priorities Board and Priorities Administrator are abolished. In their stead, a Division of Priorities is established in OPM headed by Edward Stettinius, who drops his raw materials assignment. This division, subject to the approval of OPM, establishes policies and executes them. The power to give compulsory priority to government orders, approved by Congress last summer, is vested in this division. There is also a new six-man Priorities Board, but this is merely a group of defense big-shots (the two OPM directors, the three divisional directors, plus price commissioner Henderson), which gives advice to Stettinius.

The Priorities Division faces a big job. The system of voluntary priorities administered by the priorities committee of the Army and Navy Munitions Board has always been a temporary and more or less makeshift arrangement. Few have had a good word to say for it. It has no legal backing, and the allocation of ratings to specific orders has been considered not very efficient—particularly in the overloading of the A-1 rating. In the three months between its creation and abolition the Defense Commission priority organization labored over the problem of re-scheduling outstanding priority ratings and establishing a permanent procedure which would fit its compulsory powers into the voluntary system. Just before the reorganization, solutions to these problems had been embodied in a code of regulations. But the regulations were wiped out along with the organizations that drew them up, and the Priorities Division has the job to do over again.

Surviving the debacle is the new simplified system for extending voluntary ratings to sub-contracts. A contractor, holding a government order with a preference rating and who wants to get priority on one of his subcontracts, may attach the same preference rating to the sub-contract merely by certifying to the sub-contract that prompt fullfilment of the subcontract is essential to fullfilment of his prime contract and getting the government inspector in charge of his contract to counter-sign the certification.

Re-scheduling of priorities was under way at the time of the reorganization. The main approach, which will probably still be used, was to break down the A-1 ratings into sub-classifications A-1-a, A-1-b, etc., according to the urgency of the contract. Relative rank within the A-1 rating was roughly as follows: Government orders for machine tools, specially urgent munitions, airplane engines, airplanes. Non-government orders for machine tools would ordinarily be sub-contracts and bear the preference rating of the prime contract on which they were to be used. Position of British orders in this hierarchy was still undecided—whether to give them a blanket rating inferior only to machine tool orders or whether to treat them on a parity with U. S. orders for the same article. The arms-loan plan would seem to insure that the second alternative will be adopted.

Although no longer in effect, the regulations adopted last month probably offer a clue to the procedures likely to be adopted by the new Priorities Division. If this is the case, it will work like this: The Munitions board will attach appropriate voluntary preference ratings to Army and Navy orders for commodities included on a list of critical materials. (Orders for items not on the list get no ratings). Orders of defense importance issued by buyers other than Army and Navy may obtain voluntary ratings from the Priorities Division if they are for items on the critical list. This would include the case of sub-contracts which need a higher priority than their prime contract. If, on any speci-

Harris & Ewing

New Priorities Board—*Discusses organization and procedural routine at its first meeting. The members are: Capt. A. B. Anderson, representing the Secretary of the Navy; Leon Henderson; William S. Knudsen; Edward Stettinius, Jr.; Donald M. Nelson; General R. C. Moore, representing the Secretary of War; and John D. Biggers. Stettinius, chairman of the board, is also a member of the National Defense Advisory Commission. So are Henderson, Knudsen, Nelson, and Biggers*

E. J. Hunt, Chrysler Corp., operating manager of the U. S. Army tank arsenal which Chrysler is building for the U. S. in Detroit, and Lt. Col. H. W. Rehm, Army Commanding Officer of the arsenal, attend the ceremony at which the United States flag was officially raised over the arsenal

B. E. Hutchinson, Chairman of the Finance Committee; K. T. Keller, president, Chrysler Corp.; Major General E. B. Gregory, Quartermaster General, U. S. Army; and Fred M. Zeder, vice president and chairman of the board, Chrysler Corp., inspect the progress made in the construction of the $20,000,000 arsenal. Five 25-ton tanks are scheduled to come off the assembly lines per day per shift

fic contract, voluntary cooperation is not obtained, the Division would issue a compulsory rating on that contract having the force of law.

The Priorities Division will probably not get around to issuing a new set of regulations until it completes its internal organization. The Division is being divided into sections corresponding to the major types of article which might need priorities. One section on metals and minerals will be headed by Ernest M. Hopkins, President of Dartmouth College. Another on Commercial Aircraft will be headed by Arthur B. Whiteside of Dun & Bradstreet. Others will be appointed later.

Within the sections, industry committees headed by the chief of the section will be named for specific items which are or might be on the critical list and hence subject to priorities. They will be advisory to the Division.

First such industry committee to be named is one on steel. Formation of this committee does not mean that steel has been added to the critical list, but it does mean that such action is being considered.

Membership of the committee probably offers a pattern for future committees. It consists of a representative of the suppliers, Walter Tower of the Iron and Steel Institute, an industrial consumer, Carl Conway of Continental Can; a Navy man, Capt. Paul Hendon, and an Army man, Col. H. C. Minton.

Sub-contract Plane Parts

WASHINGTON—Douglass Aircraft Co. has parceled out four sub-contracts valued at $100,000,000 for aircraft parts to be manufactured by automotive plants. These jobs are part of a plan to use the automotive industry's surplus capacity.

Canada Faces Temporary Steel Shortage; See Machine Tool Production Rise in 1941

MONTREAL—For 1941 Canada's most urgent need is steel. Government estimates see a one million ton shortage in the coming year; steel requirements will be 3,100,000 tons as against present productive capacity of 2,100,000 tons. The Controller of Steel has already ordered rolling mills to confine production to a relatively few standard shapes. Manufacturers have also been advised to find substitutes for steel to be used in products not required for war needs. Imports, mostly from the U.S., are expected to be increased.

Meanwhile, a sharp increase in Canadian machine tool production is expected in 1941 by Thomas Arnold, machine tool controller. In 1940, Canada's machine tool output totaled $10,821,949 as against $1,548,419 in 1939, an increase of approximately 800 per cent. As a part of the expanded production, the government owned Citadel Merchandising Co. is purchasing $40,000,000 of machine tools for Canadian plants.

Government expenditures on plants and expansions, completed or underway, total $280,000,000. The plants, all of which are expected to be producing this year, will manufacture goods valued at $800,000,000 annually. The entire industrial output for 1940 is valued at $3,738,000,000. For 1941 the output will be over $5,600,000,000.

Under new contracts arranged with the John Inglis Co., Toronto, which has been making Bren machine guns for the Canadian and British governments, the Canadian government is taking over ownership of the plant, will pay the Inglis Co. a management fee. The new contracts, which do not include the original Inglis plant, are retroactive to the very beginning of the Bren gun enterprise in 1938. The extensions of the old plant, which were financed by the government, now so far overshadow the original private concern that the government decided to take control of the organization in which it had come to have a predominate interest.

Recent government contract awards follow: Aircraft, Canadian Pratt & Whitney Aircraft Co. Ltd., Longueuil, Que., $81,221,938; and Fairchild Aircraft Ltd., Longueuil, Que., $213,840. Machinery, Vivian Engine Works Ltd., Vancouver, $84,608; and Wm. M. Brennan, Esq., London, Ont., $38,352. Shipbuilding, Marine Industries Ltd., Sorel, Que., $240,000; Star Shipyard (Mercer's) Ltd., New Westminster B.C. $108,000; Canadian Power Boat Co. Ltd., Montreal, $2,724,717; Pictou Foundry and Machine Co. Ltd., Pictou, N.S., $153,191; Halifax Shipyards, $100,000.

KNUDSEN OF CANADA

OSHAWA, ONT.—Harry J. Carmichael, vice-president and general manager, General Motors of Canada, Ltd., and president of McKinnon Industries, has resigned these positions to take a key post in the Munitions and Supply Department. He will be associated with the head of the War Priorities Board in a position described as the "Knudsen of Canada."

When Tooling up for Munition Parts, save TIME - MONEY and WORRY by using these Proved Cutting Fluids FROM THE START!

TAKE advantage of the lessons that others have learned in solving the tough problems of achieving maximum production on munition parts work. STUART OILS together with STUART OIL Engineering Service will help set you up for top efficiency—*right from the start!*

STRAIGHT CUTTING OIL

Stuart's Thred Kut

Widely used by Government manufacturing armories and arsenals and the aircraft and related industries. Highly recommended for tapping, threading, deep drilling, broaching, gear cutting, and for all machining of alloy steels.

WATER SOLUBLE CUTTING OIL

Stuart's SOLVOL

This new type of liquid cutting compound was developed because of the need for a "water coolant" capable of handling certain tapping, threading and very high speed turning operations on carbon steels that heretofore demanded straight cutting oil. Stuart's SOLVOL has a higher cutting quality and rust preventative value than ordinary soluble cutting oil. Try it on a few "borderline" jobs and see the difference.

WATER SOLUBLE GRINDING COMPOUND

Stuart's CODOL

This liquid grinding compound is known and widely used throughout the United States, Canada and Europe. It is highly regarded as an advanced development in grinding lubrication.

THREAD GRINDING OIL

Stuart's TK-99 or SK-81XR

Use Stuart's TK-99 on alloy steels, and Stuart's SK-81XR on high carbon steels. Get production speed up where it counts!

Write . . . wire . . . or phone today for trial drums of these Stuart Products. You'll get 100% satisfactory performance or 100% credit. That's our guarantee.

For All Cutting Fluid Problems

D. A. STUART OIL CO., Ltd.

CHICAGO, U. S. A. - ESTABLISHED 1865

Warehouses in All Principal Metal Working Centers

INSIDE DETROIT

1942 model cars will have the newest in styling and mechanical changes despite participation of auto firms in National Defense. Record car and truck production is expected as market expands.

BY RUPERT LE GRAND, DETROIT EDITOR

DETROIT—There will be plenty of "ohs" and "ahs" when the 1942 cars are unveiled. Auto firms have been able to contract for idle capacity in independent die shops without currently or prospectively interfering with national defense. The over-all size of the 1942 sheet-metal program cannot be determined until all contracts have been placed. It is evident, however, that motor-car manufacturers are not pulling their punches on styling changes through fear of material shortage and government restrictions upon output.

Last fall the auto industry went on record against new-model changes that would interfere with national defense. Procurement of new machinery and tooling in competition wiith defense manufacturers was definitely ruled out. For this reason, mechanical changes will largely rest upon the ability of auto and parts concerns to find equipment within their plants for such purposes. Sheet-metal changes fall into another category, because the types of equipment and the skills possessed by automative die shops are such that there is not much opportunity to employ them in national defense work. Machinery installed in the die shops is too large for strictly tool work and working tolerances are not sufficiently close. Local tool shops, on the other hand, are presently working at full capacity, with 70 per cent of orders related to national defense. Within a short time it is expected that most, if not all, of the local toolmaking capacity will be absorbed by government needs.

Program Ahead of Schedule

The new automotive-die program is approximately two months ahead of the 1941 model season. Local circles understand that General Motors is again following the policy of introducing a new body, while carrying over two other bodies with a number of fender, hood, door and trim changes. Buick is reported to be well along on perhaps the largest program in its history, and Oldsmobile has been active. Hudson is also reported out with extensive die changes.

Because of the demands of national defense the New York Auto Show, held annually since 1900, has been cancelled for this year. The cancellation, however, will not effect the plans of individual auto manufacturers who will introduce new models as usual next fall.

Current die programs have little relationship to introduction of mid-season models. About the first of February, Buick will announce a shorter wheelbase car with a new body. This model will be initially quoted a few dollars cheaper than the present lowest-priced model. When next fall rolls around, and prices must be advanced to cover the increase in cost of materials, the Flint concern will still have a car or cars competitively priced with the field.

Packard means to let nothing stand in the way of maximum achievement upon its Rolls-Royce aviation engine program and the expanding marine-engine project. To avoid conflicts next summer between introduction of new models and national defense work, the company has developed a complete new line of cars and will announce them to the public in March. The present series has been extensively redesigned, according to reports, and a new ultra-streamlined model has been added. With minor changes, these mid-season cars are expected to serve as 1942 models. Briggs will play a more important part in supplying bodies and stampings to Packard.

Car and truck production within the United States is expected to set a new record in the first quarter by showing a gain of 10 per cent over the output of 1,259,911 vehicles produced in the similar 90-day period last year. While the production forecast of 1,385,000 units is down slightly from the pace established in the last quarter of 1940, the remarkable stability of the industry is illustrated by the smallness of the decline—4 per cent.

Until future sales reports indicate otherwise, it may be anticipated that the market can absorb current auto production. Year-end reports from several makers revealed that new-car stocks in hands of dealers constituted less than a month's supply, and that the used-car turnover rate had not slipped despite the much larger current volume of new-car business as compared with a year ago. Inventories of used cars are larger by number and value, but the turn-over rate remains steady and within conservative bounds. The used-car market is expected to continue brisk with prices firm.

Dire forebodings are being expressed in Detroit about possible curtailment of automobile output through shortages of materials, especially steel, or else by government decree. Nobody seems to have a clear idea of how or why either of these restrictions will come about. Can it be that such rumors are circulated in order to drive

G-M BOMBER PROGRAM

DETROIT—General Motors has been actively setting up a plan whereby its parts and body divisions will manufacture parts and sub-assemblies for the North American Aviation Co.'s B-25 bomber. G. M. controls North American, and presumably will handle the bulk of the work supplied to that aviation manufacturer for final assembly. The task of re-arranging plant facilities, transferring operations and drawing supervisory personnel from its far-flung plants has posed a problem of first magnitude for the corporation. It is believed that G. M. will set up the enterprise to produce more than 100 bombers per month, a figure mentioned in the press. Many thousands of workers must be found and trained.

in sales? Moderate opinion about materials shortages inclines to the belief that ample supplies will be available until late summer or fall at least, and perhaps longer. Nothing has been uncovered to show that a pinch will be felt so far as the balance of the 1941-model run is concerned.

Chrysler Corporation has reached a tentative agreement with the Glenn L. Martin Co., whereby the motor-car manufacturer will make fuselage parts for the B-26 bomber. An aircraft division is now being set up by Chrysler with some of its best manufacturing personnel as the nucleous. Tooling for the project will be let in about two months, and production will be commenced this summer. About 1,000 persons will be employed by Chrysler at the "West Warren" plant (600,000 sq.ft. of space leased from Graham-Page plant for a three-year period). Goodyear will produce undercarriage parts.

Location of the Buick aviation-engine plant has been a matter requiring considerable study. While Flint, or its vicinity, might seem desirable to some, it is understood that General Motors is not anxious to plump down an additional industry there, with the prospect of drawing thousands of workers into the community and then stranding them after the contract is completed. Chicago has been considered as a more suitable site because it possesses a large labor pool. Buildings and equipment are likely to cost approximately $30,000,000, up several millions from the announcement by the National Defense Commission. Between 6500-7500 engines are believed involved in a deal estimated at approximately $100,000,000 for engines alone. Buick has already made 40 personnel shifts in order to set up a separate aviation-engine division.

Studebaker has obtained A. Michaeloff, formerly general manager of the Chrysler fluid drive plant, as manager of the aviation-engine plant it will erect in Chicago. Studebaker will erect three plants in all.

(advertisement)

Manufacturers Look to Steel Warehouses for Quick Defense Requirements

Many leading manufacturers are relying on nearby steel-service plants for prompt, stock shipment of steel to meet the current surge of business prompted by Washington's defense program.

Probably the leading exponent of "Immediate Steel" is Ryerson with a net work of ten strategically-located plants each of which has large and complete stocks of steel and allied products. In addition, each plant is equipped with complete forming and cutting facilities so steel can be prepared to customers' exact requirements. No shop should be without the Ryerson Stock List (see advertisement below).

Thusands of manufacturers report saving considerable time, trouble and money by taking advantage of Ryerson's complete flame cutting service. Modern equipment manned by specially trained operators can quickly burn any shape—no matter how intricate—from carbon or alloy steel plates and billets up to 15" thick.

"Cracker Barrel Steel" is Gone!

BACK IN THE "GOOD OLD DAYS" crackers came in barrels; and many people bought steel, too, with no clear idea of what it was, or how it was made. Methods of storing and handling were "hit-and-miss"; results to be expected were uncertain! Crackers were crackers; steel was steel!

It is different today—with both! The Ryerson plan of Certification provides definite data on every ton of the steel in the vast Ryerson stocks. You *know* the steel you're getting. You have accurate information as to its chemical and physical characteristics, its strength, hardness, heat-treatment response! You can select Ryerson Certified Steel with positive assurance that it is the kind and quality *exactly* suited to the job you want it to do.

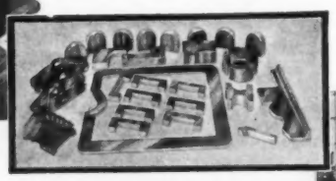
Ryerson stocks are complete; shipment is immediate! One of the ten Ryerson plants, conveniently located near you, is ready to serve you. Get acquainted now with the many advantages of this *modern* steel-service. 1940-41 Stock List will be sent promptly on request.

JOSEPH T. RYERSON & SON, INC., Chicago, Milwaukee, St. Louis, Cincinnati, Detroit, Cleveland, Buffalo, Boston, Philadelphia, Jersey City.

RYERSON Certified STEELS

DoAll STEPS UP PRODUCTION

At the Ingersoll Milling Machine Company, Rockford, Ill., discs for bearing retainers are made from 3140 flat steel on a DoAll in 30 minutes each. Outside diameter is 12", inside 9". A DoAll automatic circle cutting attachment is used.



Other special parts made on the DoAll by Ingersoll include a target gauge in 15 minutes, 2 rocker arms in 12 minutes, head stops in 1 hour each.

INDISPENSABLE IN DEFENSE WORK

The DoAll is the rugged machine tool that effects such sensational savings in time, labor and material. Takes the place of lathe work, milling and shaping in thousands of plants. Now used in 30 countries for cutting every kind of metal in automobile factories, arsenals, ship yards, aeroplane plants, machine shops, etc.

CONTINENTAL BAND FILER

Does continuous filing, which means faster, better, smoother filing on all materials from toughest high-carbon steel to soft brass, wood, etc. Available are 12 styles of file bands, 3/8" and 1/4" wide—flat, oval or half round. Ask for circular.

SPEEDMASTER

An important part of every DoAll Machine. Gives instant variable speed.

A compact unit, also sold separately for use on any other machines requiring variable speed. Produces any speed, 6 to 1 ratio, by mere touch of handle.

Let us send a factory trained man to your plant to show you what a DoAll can do and save for you.

FREE—Handbook on Contour Machining, 158 pages of valuable metal working helps.

CONTINENTAL MACHINES, INC.

1310 S. WASHINGTON AVE. MINNEAPOLIS, MINN.

LEND-LEASE AID

WASHINGTON—Amendments to the President's "lend-lease" aid to the Allies are on the way but they won't interfere with the objectives. The indefinite term of power asked for will probably be limited to two years, although if the war is still going on it will be renewed. Britain is already getting all the material which the Administration dares take away from the Army and Navy. The bottleneck is production, not legislation. British assets will last longer than isolationists can talk. Main concerns of the Administration: produce munitions fast enough to meet Axis threats; ascertain whether the American public would stand for war if Britain falters.

Speed 200 Ship Program For U. S. and Britain

WASHINGTON—Airplanes and ships are teetering the balance for high place on Britain's list of strategic needs. The U. S. has launched with unprecedented speed a program of 200 vessels to bolster the cargo capacity of the U. S. and Britain, whose interests on the sea are now almost identical.

Contracts for building some 85 of the ships were reported already completed and lack only the approval of the Defense Commission. The *Journal of Commerce* reported that California Shipbuilding Corp. would get 31; Oregon Shipbuilding, 31; and Houston (Texas) Shipbuilding, 25.

Seemingly in confirmation was the Maritime Commission's statement that contracts have been signed with firms in Los Angeles, Houston, and Portland, Oregon, for construction of new shipyards needed in the 200-ship plan which will cost about $350,000,000. This money will be appropriated by Congress for defense. The Maritime Commission is handling the project.

An effort is being made to spread the building geographically for minimum interference with the Commission's regular C-ship program.

NEW NAVAL FUNDS SPEEDED

WASHINGTON—A bill approved by the House Naval Affairs Committee last week gives the Navy 400 small ships at a cost of $400,000,000, in addition to present authorized expansions. This year 280 urgently needed submarine chasers, mine sweepers, and motor torpedo boats will be built. Necessary shipyards and facilities, mostly on the Great Lakes, will probably cost $315,000,000. Included in the bill is $194,000,000 to provide guns, cargo ships, armor, and other munitions for the U. S. and Britain. Total expenditure is $1,209,000,000. Already approved by the committee is a bill authorizing Navy to spend $300,000,000 on anti-aircraft defenses.

Metal-Workers To Get "Nobel Prize" Awards

NEW YORK—Revere Copper & Brass Inc,. through its president, C. Donald Dallas, has posted awards totaling $10,000 which are open to all wage earners (foremen and workingmen) in the metal and metal-working industries and to all machine maintenance men. The awards are being made to help speed national defense by encouraging the mechanical genius and inventive talent of American wage earners. Winners will be chosen for the inventions, devices, improvements of ideas which contribute most to speeding up America's defense program. Selection will be made by an impartial Jury of Award consisting of men high in science, labor, the Army, Navy, and Industry. The awards are divided as follows:

1st Award	$5,000
2nd Award	2,500
3rd Award	1,000
4th to 9th Awards...	250 each

Advertisments announcing the awards have appeared in representative papers over the country. "In science there is the Nobel Prize," states Mr. Dallas in the announcement. "For engineers, a score of awards. But there is no award for the gifted men now working at the lathes, forges and work benches of industry. As a contribution to our national defense, Revere Copper & Brass, Inc., is establishing such an award—a Nobel Prize for the workmen in America's metal working industries."

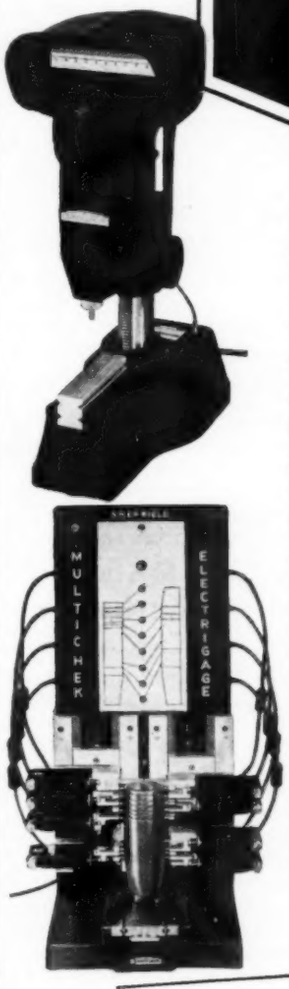
British Machinery Losses Claimed to be Negligible

LONDON—The heavy raids on industrial centers in England are claimed by the Government to have caused smaller damage to machine tools than might have been expected. Damage is expressed as affecting only one out of four damaged tools severely. That is, 75 per cent of machine tools damaged as a result of raids are quickly repaired and returned to production. Only 25 per cent of damage is beyond repair.

The situation is attributed by the Government to the policy of decentralization of industry that has been pursued by both the Ministry of Supply and Ministry of Aircraft Production. This method has spread the risk of damage so widely that even a severe raid is said to only interrupt output for a short time.

An effort is being made to secure and place in productivity every possible machine tool available. A survey determined that a number of industries not directly connected with war production could relinquish certain tools which are used only occasionally in their shops. The companies could then pool their repair facilities. Such action has enabled some 4,000 machine tools to be placed in full time operation.

IN AN EMERGENCY NOTHING IS SAFER THAN SPEED



Our national safety today depends on the speed with which we can produce those products necessary to vital defense—speed coupled with precision in machined products.

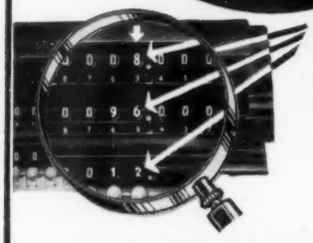
Speed and Precision are the outstanding characteristics of those Sheffield Gages utilizing the Reed Mechanism—notably the Multichek Electrigage and the Visual Gage, used in checking dimensions of manufactured and purchased parts, tools, production and master gages.

The action of the Reed Mechanism is instantaneous and always absolutely positive. The Reed Mechanism employs no gears, knife edges or levers and there are no rubbing contacts in its action. It is never subject to frictional wear. The use of this mechanism makes Sheffield Gages the most rapid precision instruments available.

If you are engaged in peace time production or national defense work, write for descriptive data on Sheffield Gages.

SHEFFIELD
GAGE CORPORATION • DAYTON, OHIO, U.S.A.
MASTER GAGEMAKERS

for calculating
Jig Boring Centers
and other uses!



All 3 factors stand in full review

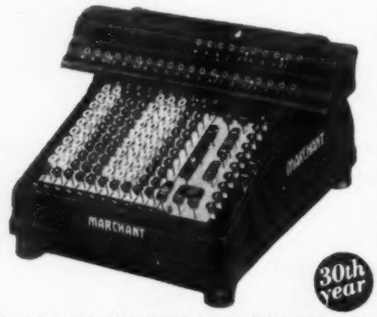
MARCHANT

the electric calculator with straight-line true-figure dials for ALL 3 FACTORS

It's not economical for high-wage employees to figure with pencil and paper, because MARCHANT will give "the answer" in a jiffy... correctly pointed off... with all three factors in plain sight for checking.

This is why MARCHANT is so popular in shop and drafting room... for all work where slide-rule accuracy does not suffice.

Try an Automatic Electric MARCHANT at our expense. They're priced to fit your job... budget terms if desired.



TEAR OFF COUPON AND MAIL TODAY!

MARCHANT CALCULATING MACHINE COMPANY
HOME OFFICE: OAKLAND, CALIFORNIA, U. S. A.
Sales Agencies and Manufacturer's Service Stations Give Service Everywhere!

Gentlemen: AM 1-22-41

☐ We wish to try a Marchant at no obligation to us.
☐ Send "7 place Natural Trig. Functions with Increments to Seconds" (25 cents in stamps enclosed).
☐ Send "Simplified Sq. Root Method" (no charge).
☐ Send pamphlet "Conversion of Decimal Ratio to Common Fraction for Gear Design" (no charge).

Firm _____

Individual _____

Address _____

Use margin of page if necessary.

WATCHING WASHINGTON

Knudsen plans for 300 bombers a month in a year by utilization of idle automotive facilities; U. S. will build and own four assembly plants. Numbers and design in planes still debated

By BLAINE STUBBLEFIELD

WASHINGTON—Three hundred bombers a month about a year or more from now is what Knudsen's plan for utilization of unused automotive facilities seems to boil down to. When the plan goes into operation it will provide 100 a month each of Martin B-26 and North American B-25 two-engine bombers and Consolidated B-24 four-engine bombers. Output rates will doubtless be stepped up beyond these figures as the program gets along.

As the plan stands, the government will build and own four assembly plants. Martin will operate a plant at Omaha, and will take a contract from the Air Corps for some 4,000 B-26's. It will sub-contract manufacture of most of the parts to Chrysler Corp., which will use its existing machinery for the work and use vacant plant space to do sub-assemblies.

Similarly, North American will operate a government plant in Kansas City and get its parts under subcontract from General Motors; there is, of course, a close corporate connection between these firms.

The Consolidated bombers will be assembled in two plants at Tulsa and Fort Worth. Douglas will operate one of these plants, under a licensing arrangement. Ford will make the parts for these ships.

Facilities of other automotive manufacturers will be brought into the program via sub-sub-contracting by the three auto firms. Chrysler, in particular, plans to farm out a great deal of its work for Martin.

Farthest along of the new government-owned plants is the one at Kansas City which North American will operate. This will be a windowless, air-conditioned, fluorescent-lighted, plant with more than a million square feet of floor and employing 10,000 to 15,000 men. After the war it will be used as an Air Corps maintenance depot.

Meanwhile, management brains, though not physical facilities, of the Automotive firms are being drawn into manufacture of air-cooled engines. Ford, Studebaker, and Buick are all in on this. Unlike the plane parts program, this work involves construction of entire new plants. Little attempt is being made to apply automotive technics; plants generally duplicate existing Pratt & Whitney and Curtiss layouts.

Three engine plant programs are underway in the Detroit area. Ford is farthest along with his $22,000,000 engine factory and magnesium foundry at Dearborn. He hopes to be producing Pratt & Whitney's by March, but there is considerable scepticism as to whether he can do it. The foundry is intended to have a larger capacity than the factory—in order to help relieve the general shortage of magnesium castings.

Another Pratt & Whitney factory is to be built by Buick in Grand Blanc Township, Mich., at a cost of $24,000,000. Studebaker is building $37,000,000 worth of plants for Wright engines at South Bend, Fort Wayne, and Chicago.

All of these plants are to be financed by the companies concerned. The cost will be repaid by the federal government over five years, after which title will be vested in the government.

Liquid-cooled aircraft engines are still exclusively an automotive industry product, although Pratt & Whitney is reported experimenting with this type. GM's Allison Division has pushed production to about 300 a month and is hoping for a 1,000 in the summer. Building construction for Packard's plant, at which Rolls Royce Merlin engines will be made, is nearly complete, and about a third of the machinery is installed. Some preliminary parts are being produced, but it will be the end of the year before any significant output is achieved.

Three or four liquid-cooled engines are on the Detroit drafting boards, though only Ford has officially announced he is working on the problem.

The Reuther (500-planes-a-day) plan is definitely shelved, at least for the present. Reuther's main point was the proposed organization of the industry as if it were one firm by means of a management-government-labor industry council with full power to allocate work. The plan which has been adopted for using the auto capacity sticks to ordinary commercial procedure.

Numbers vs. Design in Planes

At least two authorities now say that airplanes cannot yet be built on the production line. One of them is Air Marshal Sir Hugh Dowding, commander of Britains air defense, and Burdette S. Wright, general manager of Curtiss Aeroplane Division of Curtiss-Wright. The reason they give is that fast design change prevents tooling for mass production and that even if large numbers were turned out, they would be obsolescent in face of enemies willing to keep the design pace. On this basis we cannot have 50,000 airplanes at any one time and we cannot have productive capacity of 50,000 a year. Such capacity itself would soon lag behind design and be useless.

COMMISSION MERE ADVISER

WASHINGTON — The Defense Commission still exists, in spite of creation of OPM. But it loses its working divisions and remains as a more advisory body doing its best to protect the civil economy from the ravages of defense. Still in the Commission are Henderson's industrial price division, Miss Elliot's consumer division, and Chester Davis' agriculture division as well as such auxilliary bodies as the division of state and local cooperation, and research.

But Germany has probably more than 30,000 planes; a great many of them are "obsolete." The Stukas are three or four years old. Yet all are apparently used to good advantage. The merits of numbers against design in the air will be further debated.

Planes for U. S. Navy

Army doesn't mind so much letting Britain have most of the production of combat planes, but with the Navy it's different. The Navy might have to go into action, whereas the Army has no immediate prospect of battle. Admiral John Towers chief of the Navy air arm, tells Congress he expects to get 4,000 additional planes this year despite production delays. He said that on Jan. 1 Navy had 2,590 planes on hand. Four thousand more would make 6,590, but 300 or so would have to be deducted for washouts and decommissionings. Meanwhile Rep. Melvin J. Maas of the House Naval Affairs Committee sees no hope of appreciable increases in plane production unless planes are given priorities over other armament. Division of the Navy into a "two ocean" force, and into three fleets: Atlantic, Pacific, and Asiatic, can make no difference to ship construction, which is already at top speed. But it probably will call for delivery of more naval airplanes for patrol and scouting. Any more planes the Navy gets is an equivalent loss to the British.

Small Firm Sub-contracting

Morris Cooke, who is handling the current push on sub-contracting from the side of the small scattered firms who will take subcontracts, has compiled a list, broken down geographically and by type of work, of all prime contractors with armament contracts over $100,000. The local "pools" of small firms, formation of which Cooke is pushing, can use this list in seeking sub-contracts. The first pool formed, at York, Pa., is already completely loaded with work. Cooke is especially impressed by the fact that a pool in three rural Virginia counties was able to turn up 350 tools. There is still skepticism among some defense officials as to whether enough effective machinery is being established.

TORRINGTON NEEDLE BEARING

improves brake and landing gear performance for Kingham Trailer...

High mechanical efficiency of the Needle Bearing is utilized by Kingham in both brakes and landing gears.

"Torrington Needle Bearings have increased the efficiency of our brakes and landing gears," says E. J. Lucas, Sales Promotion Manager of Kingham Trailer Company, Incorporated. "They give the quick brake release and application essential in present-day traffic.

"In the landing gear, their greater efficiency, compared with plain bushings, allows the landing gear to be operated with less effort—an important sales feature, for the operator of the gear often is responsible for purchase of equipment.

"Moreover, installation of the Needle Bearing is easy, space is small, and cost is low, especially in view of the advantages we gain by using it."

You, too, can build extra sales features into your product by using the Torrington Needle Bearing. If your bearing requirements call for high capacity, low cost, and small space, you will find the Needle Bearing an ideal solution. Our Engineering Department will be glad to work with you in laying out applications for the Needle Bearing in your product. For more detailed information, write for Catalog No. 105. For Needle Bearings to be used in heavier service, ask our associate, Bantam Bearings Corporation, South Bend, Indiana, for Booklet 103X.

THE TORRINGTON COMPANY, TORRINGTON, CONN., U. S. A. • ESTABLISHED 1866

Makers of Needle and Ball Bearings

New York Boston Philadelphia Detroit Cleveland Chicago London, England

TORRINGTON
NEEDLE BEARING

PRECISION FOR DEFENSE

Thousands of separate parts go into a modern fighting plane. And these parts have to be accurately manufactured to within extremely close limits. Because this calls for Precision Tools of the most extreme accuracy, Lufkin is already playing a prominent part in America's Defense Program.

But there is nothing new about the enormous demand for Lufkin products. For fifty years leading American machinists, engineers, mechanics and contractors have looked to Lufkin for easy-to-read, easy-to-handle, accurate measuring devices. If you have need for the best Precision Tools, Tapes or Rules, it will pay you to specify Lufkin.

LUFKIN

TAPES • RULES • PRECISION TOOLS
SAGINAW, MICH. • NEW YORK CITY

Japan's Machinery and Tool Production Hits New High

TOKYO—A Commerce Office report on industrial progress reveals that Japan had 137,422 manufacturing plants at the end of 1939. This is an increase of 25,090, or 22.3 per cent over 1938. Most of the increment occurred in the machinery and machine tool industry which recorded a 31.2 per cent rise from the preceding year. At the end of 1939 the machinery industry employed a 29.9 per cent of all industrial workers, the value of industrial production increased 23.9 per cent over the preceding year, and the production of machinery and tools increased 41.9 per cent.

An emergency law, effective when the U. S. subjected machine tools to export licensing, now obliges all owners and operators of machine tools to register their stock with the government. Official circles explain that in this way the Commerce Office will be able to help the mechanical industry display its full capacity, estimate the amount of materials needed for consumption, replacement and repairs.

While the extension of the American export licensing system has hampered Japanese imports, Japan's inability to make monetary advances on orders, practically spells the end of imports. Under the existing Japanese import licensing system, the Department of Finance does not allocate exchange for imports unless the American maker has first obtained authorization to accept the order for delivery to Japan. However, most U. S. machine tool builders refuse to accept orders from Japan and, accordingly, to apply for export licenses on these orders if they are not accompanied by a down payment of 30 to 100 per cent in inland credit. The down payments require authorization by the Japanese government which will not provide the credit unless the order is accepted first. The result is that business is confined to a few special cases involving Japanese organizations which have credits available in the U. S. Meanwhile, the Tokyo Machinery Import Association, acting as a price control organ for the Department of Commerce and Industry, has decided to allow importers of machine tools a maximum profit of ten per cent.

ELECTRIC TRUCK SALES RISE

CHICAGO—Bookings for electric industrial trucks and tractors for December 1940 comprised 301 units as compared with 249 for November. This continues the upward trend of the past year as recorded by the Industrial Truck Statistical Association.

Total net value of chasses only, booked in December, was $1,069,902 as against $827,003 for November. Cantilever trucks totaled 270 units, with capacities and base prices running from 1,000 to 20,000 and $1,750 to $12,390, respectively, and with a total net value of $973,615. All net values given are at factories.

NAMES in the NEWS

George B. Kutz has been appointed District Sales Manager, southeastern territory, Wright Manufacturing Div. of the American Chain & Cable Co., Inc., York, Pa.

Edward B. Newill, formerly assistant general manager of Frigidaire, has been appointed assistant to the vice-president of General Motors Corp. Edward R. Godfrey succeeds Mr. Newill as assistant general manager. Mr. Godfrey, former head of Frigidaire's manufacturing division, is succeeded by Mason M. Roberts.

Ralph H. Norton, president, Acme Steel Co., has been named Chairman of the Board. James E. MacMurray, former chairman of the company, has retired. Charles S. Traer, former vice-president in charge of production, succeeds Mr. Norton as president. Chester M. MacChesney succeeds Frederick C. Gifford, retired, as first vice-president. Carl J. Sharp. vice-president, will take over Mr. Gifford's duties as director of sales.

T. C. O'Donnell, works manager, Gilbert & Barker Mfg. Co., Springfield, Mass., has been named vice-president and director of the company. Mr. O'Donnell will continue to serve as works manager.

G. Donald Spackman has been appointed general manager, Lukens Steel Co., Coatesville, Pa. Mr. Spackman has been associated with the company since 1919.

Stanley I. Vaughn, former manager of the experimental shop, Curtiss Aeroplane Div. of Curtiss-Wright Corp., Buffalo, N. Y., has been appointed factory manager of the organization's aircraft plant now under construction at Columbus, Ohio.

Charles E. Wilson, who has been acting president of the General Motors Corp. since William S. Knudsen resigned last June to become National Defense Commissioner, has been elected president of the corporation. Mr. Wilson joined the company in 1919 as chief engineer and sales manager of the Remy Electric Company, a subsidiary. He has been associated with the organization in an executive capacity for more than 20 years.

PLANT EXPANSION

Airesearch Manufacturing Co., Los Angeles, will construct a new factory building at Venice, Calif., at a cost of $125,000.

Consolidated Aircraft Corp., San Diego, Calif., will double its present floor space through a $7,000,000 plant expansion program.

LAST CALL FOR EXHIBITORS

1941

MACHINE & TOOL PROGRESS EXHIBITION

CONVENTION HALL, DETROIT
MARCH 25 TO 29 INCLUSIVE

If you are producing machines, tools or equipment needed for the defense program, you can bring them directly to the attention of the men who will buy and use them — at the 1941 Machine & Tool Progress Exhibition. Being held concurrently with the annual convention of the A.S.T.E., the timely theme of both exhibition and convention is "Education for National Defense."

At the last exhibition, more than 27,000 production executives and engineers were officially registered. Total attendance exceeded 75,000.

To date more than three-fourths of all available floor space has been reserved. However, a few booths of various sizes are still available. Booths are 10x10, 10x20, 15x20, 20x20, and 20x30 feet. If you have not already reserved space, write or wire today.

AMERICAN SOCIETY OF TOOL ENGINEERS
Ford Lamb, Exec. Secretary
2567 W. Grand Blvd., Detroit, Mich.

BRING ON YOUR BLADE-KILLING JOBS!

They're just routine for FLEXIBLE REZISTOR HACKSAW BLADE

WILL NOT BREAK — because its hard teeth are backed by its tough, annealed body.

FASTEST CUTTING — special-alloy, high-speed steel for best service in stainless steel, tool steel, bronze and similar stock.

FOR HAND FRAMES

Milford alone has Easy-Starting Teeth

FOR POWER MACHINES

Write for "Tricks of the Trades," booklet on labor-saving methods of master craftsmen.

The Henry G. Thompson & Son Co.

277 CHAPEL ST.
NEW HAVEN, CONN.

MILFORD

HAND & POWER HACKSAW BLADES

BAND SAW BLADES

Manages Lukens

C. DONALD SPACKMAN

Assists V-Pres.

EDWARD B. NEWILL

G-M President

CHARLES E. WILSON

Buffalo Arms Corp., Buffalo, will erect a large ordnance plant in Cheektowaga, N. Y. The first unit will cost more than $1,000,000 and it is expected that subsequent expansions will involve expenditures of about $10,000,000. The plant is scheduled to manufacture machine guns.

Continental Can Co., Inc., New York, N. Y., will expend $25,000,000 for expansion and improvement of manufacturing facilities in the next three years.

Doehler Die Casting Co., New York, N. Y., is building additions to its Pottstown, Pa., and Batavia, N. Y., plants to increase its facilities for the manufacture of die castings.

Gisholt Machine Co., Madison, Wis., has reopened its Northern Works in order to meet the current demands of the Defense Program for turret lathes. The expansion is 60,000 sq.ft.

North American Aviation, Inc., Los Angeles, will build a new airplane factory with 1,000,000 sq.ft. of floor space at Fairfax Airport, Kansas City, Mo.

Northrop Aircraft Corp., Hawthorne, Calif., will build a new aircraft manufacturing building, covering an area of 300 x 540 ft. at a cost of $450,000.

BUSINESS ITEMS

Taylor-Hale Machinery Co., Memphis, Tenn., will handle Caterpillar Tractor Co. products in an extensive southern area.

King Machine Co., Milwaukee, Wis., has taken over the Wisconsin Gray Iron Foundry Co., Milwaukee, and has added a $25,000 machine shop.

The Swan Tool & Machine Co., Hartford, Conn., has purchased buildings Nos. 10 and 19 of the U. S. Rubber Company's plant in Hartford. The Swan Company had leased the buildings for the past four years.

OBITUARIES

Harry H. Alexander, 74, metallurgist, who was general manager of the Perth Amboy refinery of the American Smelting and Refining Co., from 1908 until 1920, died at his home January 5. Mr. Alexander, who has made several contributions to the smelting industry, developed the "wet" method of determining the amount of lead in ore which is now universally followed. He was the first to devise a practical means of removing particles of metal from the dust and smoke of smelting furnaces.

David Milne, 63, a superintendent of the Farrell-Birmingham Co., Ansonia, Conn., died last month. Mr. Milne had been connected with the company for 35 years.

Susan Gammons, president and treasurer of The Gammons-Holman Co., Manchester, Conn., died recently at her home. Mrs. Gammons was the widow of William Booth Gammons, inventor and founder of the company. She has been president of the company since the death of Mr. Gammons in 1932.

Arthur O. Kimball, 60, president, Landers, Frary & Clark, New Britain, Conn., electrical manufacturers, died recently following a brief illness. Mr. Kimball began his association with the company at the age of 18, and in 20 years had become president.

MEETINGS

American Society of Mechanical Engineers. Spring meeting. Atlanta, Ga., April 1-3.

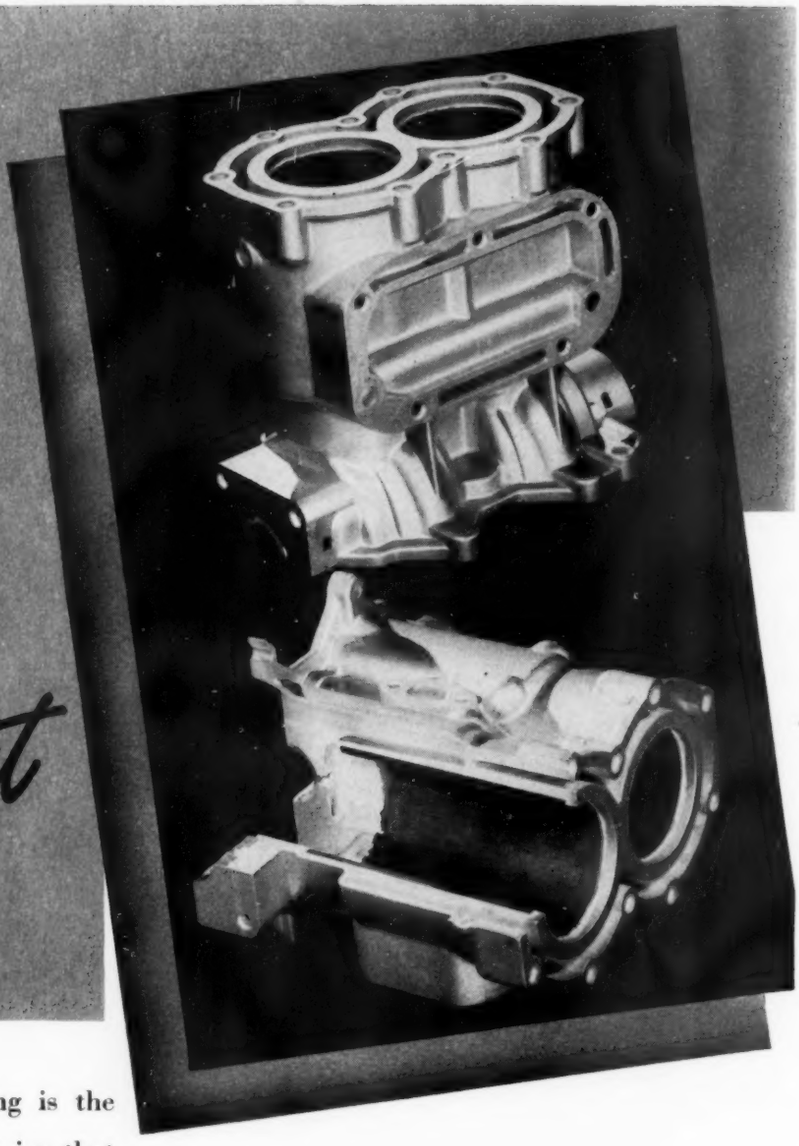
American Society of Tool Engineers. Annual meeting. Detroit, Mich., March 24-29.

Machine and Tool Progress Exhibition. Sponsored by the American Society of Tool Engineers. Convention Hall, Detroit, Mich., March 25-29.

TIME PASSES; QUALITY REMAINS

BOWER
ROLLER BEARING CO.
Detroit, Michigan

A PROCESS *designed for high output*

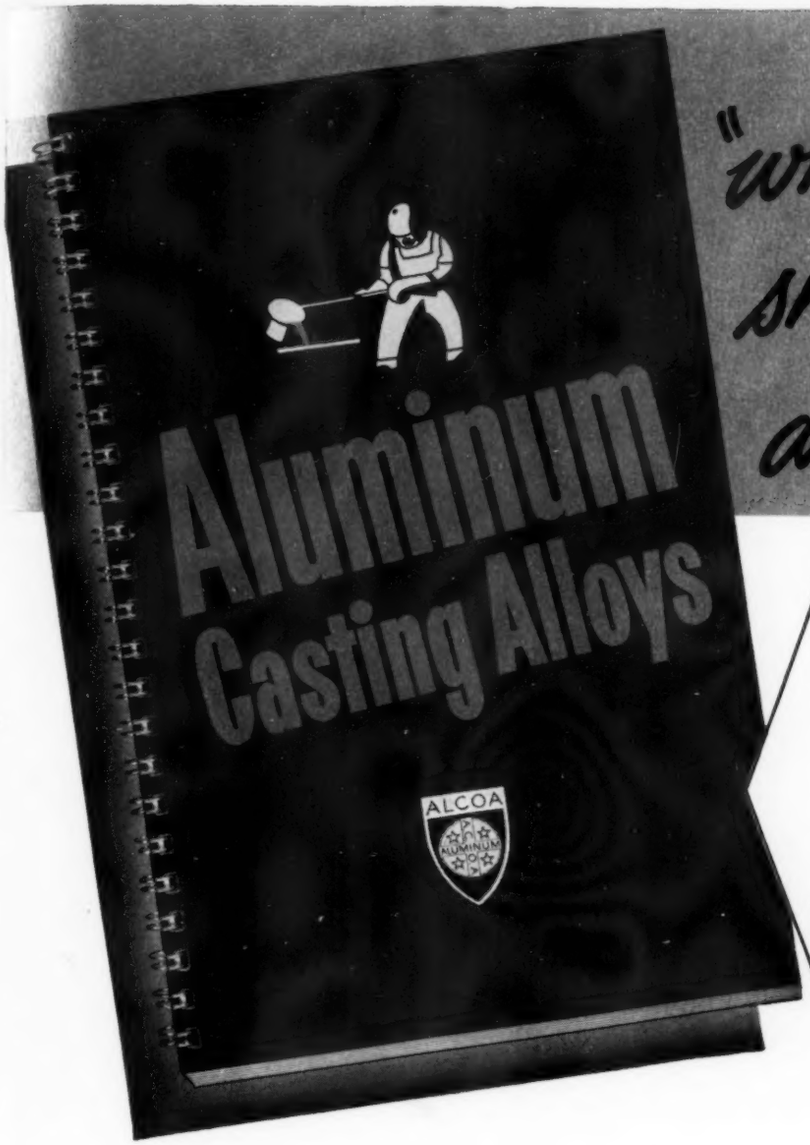


This Alcoa Aluminum die casting is the cylinder block for an outboard engine that delivers 15 hp; a lot of power to be packed in so small a space.

The cutaway section shown above emphasizes the advantages of producing Aluminum products by the die-casting process. Note the intricately cored water jacket and the finely molded exterior, the steel sleeves and bronze bearings cast in as inserts. Very little machining is required before the part is ready for assembly. The smooth surface takes a fine finish.

Where parts are produced in large quantities, it may pay you to die cast many of your Aluminum Alloy products. ALUMINUM COMPANY OF AMERICA, 2107 Gulf Building, Pittsburgh, Pennsylvania.

ALCOA ALUMINUM



"which alloy shall I use.. and how?"

THIS BOOK TELLS YOU..

DEFENSE COMES FIRST

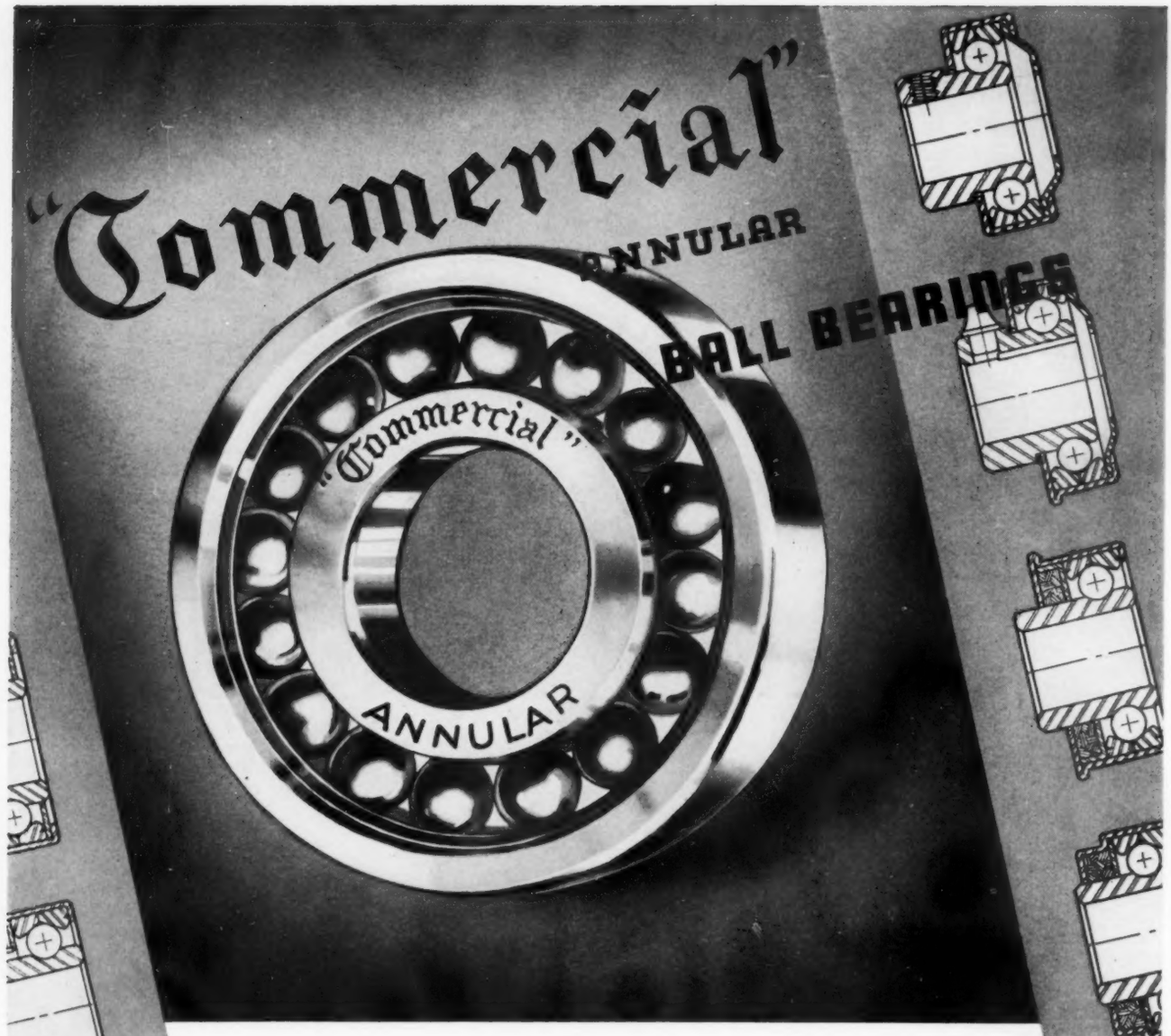
To meet the needs of the National Defense Program, plus the normal demands of peace, a vast expansion of our already greatly increased production capacity is being speeded. When the emergency is past, there will be more Aluminum available than ever before.

Meanwhile, if you can't get all the Aluminum you want when you want it, remember Aluminum is helping you by helping to meet the National emergency.

Sand-casting, permanent-mold or die-casting, this book tells you which Alcoa Aluminum Alloy will give you the required mechanical properties. A discussion of general foundry principles, ways and means of improving products, is also included.

For a copy, write ALUMINUM COMPANY OF AMERICA, 2107 Gulf Building, Pittsburgh, Pennsylvania.

ALCOA ALUMINUM



FOR ALL INDUSTRIAL PURPOSES

"Commercial" Annular Ball Bearings are adaptable to all products and machines where ball bearings are used. They are PRECISION bearings, designed and manufactured to give long, continuous service under the most exacting conditions. **"Commercial"** Annular Ball Bearings are self-contained. Speeds up to 2500 R.P.M. They readily resist shocks, strains and overloads. Dual thrust capacity. Here is everything you can ask in a quality ball bearing and the cost, per bearing, is exceptionally moderate.

STANDARD SIZES OR MADE TO YOUR OWN SPECIFICATIONS

Our Engineering Staff will be pleased to aid in selecting the right bearing for any type of job. Perhaps we can offer suggestions which will save you time, labor and money. Send for latest catalog and complete information.

THE SCHATZ MANUFACTURING CO.
POUGHKEEPSIE, N. Y.

Detroit Sales Office: 2608 Book Tower • Chicago Sales Office: 902 S. Wabash Ave.
Cleveland Sales Office: 402 Swetland Building

DOWMETAL MAGNESIUM

SAND CASTINGS

THE GROUP of aircraft sand castings shown below illustrates one of the most important DOWMETAL* developments—both as to application and as to method of fabrication.

The dependability of DOWMETAL sand castings is indicated by their extensive use in airplane construction where this metal has replaced heavier materials in motor castings, instrument housings, landing wheels and miscellaneous structural supports and brackets.

DOWMETAL sand castings are available in a series of magnesium alloys with magnesium content ranging from 85 to 99 per cent. They have excellent machinability and are made to meet the highest standards of quality.

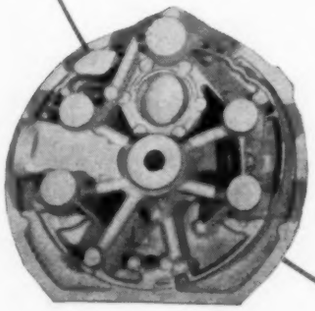
DOWMETAL, lightest of structural metals, is available in all the usual fabricated forms. In addition to the airplane industry, it finds wide acceptance in many fields—notably in the manufacture of portable tools and household appliances where lightness is desirable, but strength is essential.

Write for any additional technical information needed. Consultations invited.

THE DOW CHEMICAL COMPANY
MIDLAND, MICHIGAN

Branch Sales Offices: New York City, St. Louis, Chicago, San Francisco, Los Angeles, Seattle

DOWMETAL



*Trade Mark Reg. U. S. Pat. Off.

FOUR READILY AVAILABLE "BAKELITE" MATERIALS

To Help Industry Speed-Up National Defense

SPEED...the vital factor in our Nation's defense program ...is dependent not only upon faster manufacturing methods, but also upon an adequate supply of raw materials. To meet both these demands, Bakelite Corporation offers a group of widely diversified plastics for use in the production and finishing of durable mechanical parts and equipment.

☆ MOLDING MATERIALS—*Thermosetting and Thermoplastic*

Parts may be completely formed in a single operation from BAKELITE Molding Materials—with threaded metal inserts and other integral metal parts firmly embedded in the molding process. Finishing steps are cut to a minimum, for both color and luster are self-contained. These materials are available in a wide variety of opaque, translucent and transparent colors, in several specific types including Ureas, Phenolics, Polystyrenes and Acetates.

☆ LAMINATING MATERIALS AND SHEET STOCKS

Laminated Materials, based on BAKELITE Laminating Varnishes, are supplied by fabricators in easily-machined sheets, tubes, rods and as gear blanks—in many sizes and thicknesses. Light in weight yet tough, they are highly resistant to wear, heat, oil and moisture.

There are also crystal-clear "Vinylite" plastic sheets. Being non-shatterable and inert to chemicals and moisture, they are ideally suited for instrument dials.

☆ CAST RESINOIDS

Available in transparent, translucent and opaque sheets, rods, tubes and partially-shaped forms, BAKELITE Cast Resinoids are readily worked with standard tools. Because of their color range, these sturdy materials supply distinctive identification for control knobs, dials and other machine fittings.

☆ RESINS FOR PROTECTIVE COATINGS

Primers and top coats that dry in seconds and minutes, yet offer outstanding durability and protective value, are now made possible with BAKELITE "Dispersion" Resins. These resins furnish the base for durable, anti-corrosive shop coats, for example, that dry within one minute after being applied. Thus, coated structural steel members or forms are enabled to move quickly out of the plant without the customary delay caused by slower-drying finishes.

Bakelite Corporation will be glad to work with you in adapting BAKELITE Materials to your particular needs. Write for Portfolio 2.

BAKELITE CORPORATION, 30 East 42nd Street, New York
Unit of Union Carbide and Carbon Corporation

UCC

BAKELITE
TRADE MARKS
The words "Bakelite" and "Vinylite" are registered trade marks of Units of Union Carbide and Carbon Corporation

PLASTICS HEADQUARTERS

TO MAKE SURE YOU GET *Exactly* WHAT YOU ASK FOR

U·S·S Carilloy Alloy Steels are produced in special alloy plants, by steel craftsmen drilled to think first and always of *QUALITY*

BY quality we mean the dependable uniformity that characterizes U·S·S Carilloy Alloy Steels. Vital to every user, it is something that doesn't "just happen." We assure it by giving every alloy steel order individual care and control.

With us, the making of alloy steels is a precise and painstaking process. To give you the exact grade of steel that will do the best job for you, and to give you that steel in any quantity and as often as your orders call for, we have established separate plant facilities devoted exclusively to the production and handling of fine alloy steels. Here the finest and most modern equipment is matched by the skill of experienced operating and metallurgical personnel.

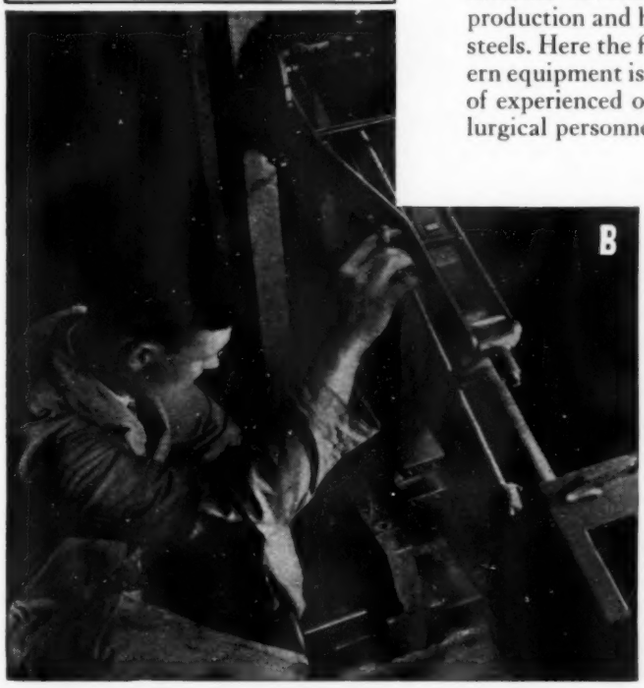
In U·S·S Carilloy Steel production, temperatures are rigidly controlled through each process. Special roll pass formations help to eliminate possible mechanical defects. Constant chemical and metallurgical checks are maintained. In melting, rolling, finishing, heat-treating, testing — in every step from furnace to final inspection, Carnegie-Illinois Alloy Steel production is on a *controlled quality basis*.

U·S·S Carilloy Alloy Steels produced under these rigid methods assure you consistently economical fabrication and insure the dependable performance of *your* product. Our metallurgical advice in their proper selection and application is yours for the asking.

PERFORMANCE FORECASTS ARE REVEALED HERE

In our 89 research laboratories, skilled metallurgists and steel technicians check steel performance, work out the proper combination of alloys for any specific-purpose steels. Constantly striving to develop new steels, to improve those already in use, it's men like these who enable us to say, "Tell us what the steel must do and we'll provide steel to do it at lowest cost."

(A) *Testing the behaviour of steel under repeated alternating stress in fatigue machine.*
(B) *Testing toughness of steel by breaking it in an impact machine.*
(C) *Taking exact measurements of strength and elastic properties with an extensometer.*



U·S·S CARILLOY *Dependable* ALLOY STEELS

CARNEGIE-ILLINOIS STEEL CORPORATION

Pittsburgh and Chicago

Columbia Steel Company, San Francisco, *Pacific Coast Distributors* · United States Steel Export Company, New York

UNITED STATES STEEL

TIMKEN TUBES RYERSON SERVICE

Smaller than "mill shipment orders" of TIMKEN Mechanical Tubing are quickly available.

Immediate delivery can be made from local stocks of JOSEPH T. RYERSON & SON, INC., at Boston, Jersey City, Philadelphia, Buffalo, Cincinnati, Chicago, St. Louis, Cleveland, Detroit and Milwaukee.

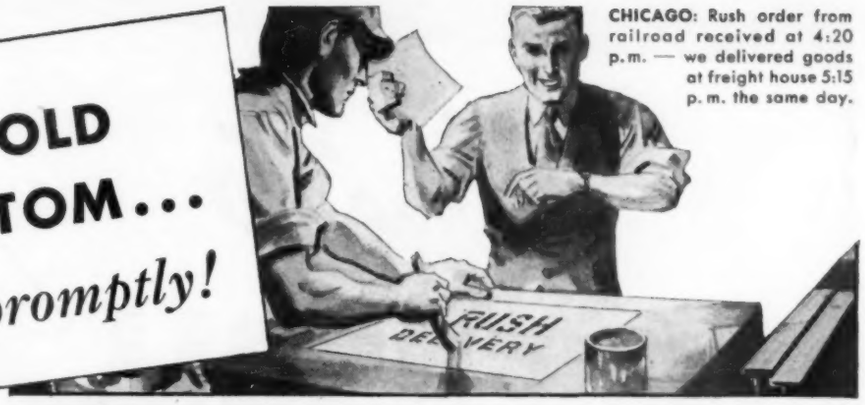
Call your nearest Ryerson warehouse for quick service at all times.

THE TIMKEN ROLLER BEARING COMPANY, CANTON, OHIO
Steel and Tube Division

TIMKEN
SEAMLESS STEEL TUBES

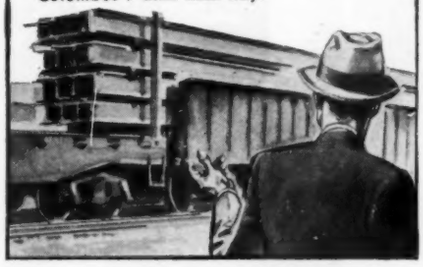
Manufacturers of TIMKEN Tapered Roller Bearings for automobiles, motor trucks, railroad cars and locomotives and all kinds of industrial machinery; TIMKEN Alloy Steel and Carbon and Alloy Seamless Tubing; and TIMKEN Rock Bits.

JUST AN OLD SCULLY CUSTOM...
filling orders promptly!



CHICAGO: Rush order from railroad received at 4:20 p.m. — we delivered goods at freight house 5:15 p.m. the same day.

CLEVELAND: Order for beams cut to special lengths received 5 p.m.; delivered in Columbus 9 a.m. next day.



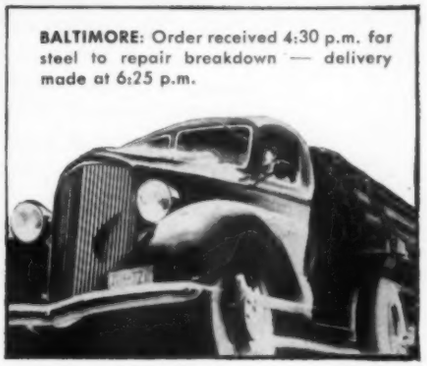
ST. LOUIS: Rush order for 12,000 lbs. miscellaneous material —some of which had to be cut—received at 2:15 p.m. Loaded on customer's truck at 4:00 p.m.

PITTSBURGH: Bridge job delayed at critical point by lack of four plates—we cut them and delivered in fifty minutes.

ST. PAUL: Emergency order received after closing. Shipment delivered in Fargo, N. D., next morning.

NEWARK: Order for 1½ tons of beams received late afternoon —shipped by fast freight; and delivered next morning.

BALTIMORE: Order received 4:30 p.m. for steel to repair breakdown — delivery made at 6:25 p.m.



BOSTON: Emergency call received on holiday afternoon. Goods delivered early next morning.

FAST, friendly service is the rule at each of the eight Scully warehouses—whether your order is large or small. That's what has made the Scully name famous. We have huge stocks on hand, ready for immediate delivery. And our warehouses are located in the great manufacturing centers—another reason why we can get your orders to you in such a hurry. So now—when quick delivery is so important whether or not you are working on defense business — give us a trial. Call Scully — for steel, steel products, copper or brass. Phone, wire or write the warehouse nearest you.

Send for the Scully Stock List and Reference Book—it's free.

SCULLY STEEL PRODUCTS COMPANY

Distributors of Steel, Steel Products, Copper and Brass

Warehouses at CHICAGO
ST. PAUL - MINNEAPOLIS
NEWARK, N.J.

The Mark of Quality →

USS Scully Service

← *The Mark of Service*

CLEVELAND · PITTSBURGH
BOSTON · BALTIMORE
ST. LOUIS

UNITED STATES STEEL

Turn to

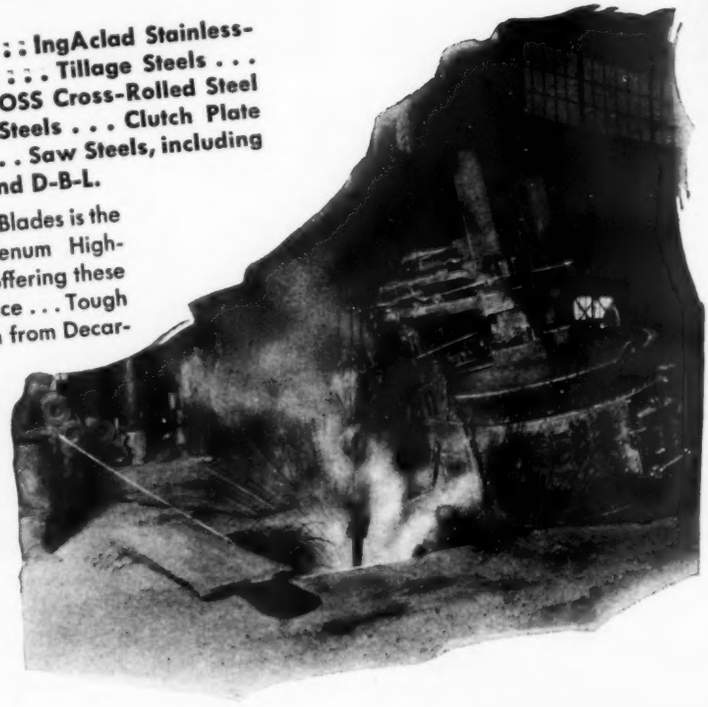
INGERSOLL

AS A DEPENDABLE SOURCE FOR SPECIAL STEELS

Memo to Purchasing Dept. See What Ingersoll offers

This Division of Borg-Warner Corporation specializes in "Steels for Special Uses." These include . . .

Armor Plate . . . Alloy Steels . . . IngAclad Stainless-Clad Steel . . . Stainless Steels . . . Tillage Steels . . . Soft Center Steels . . . TEM-CROSS Cross-Rolled Steel . . . Shovel Steels . . . Knife Steels . . . Clutch Plate Steels . . . High Speed Steels . . . Saw Steels, including "18-4-1" and Molybdenum and D-B-L.



Ingersoll *D-B-L Steel for Hack Saw Blades is the sensational new Tungsten-Molybdenum High-Speed Steel for Hack Saw Blades, offering these advantages: Higher Impact Resistance . . . Tough Cutting Edge . . . Relative Freedom from Decarburization . . . and Lower Cost. Specify Ingersoll D-B-L to cut your bills for Hack Saw Blades.

**Ingersoll D-B-L is produced under exclusive license arrangement with Allegheny-Ludlum Steel Corporation.*

Inquiries for all "Special Steels for Special Uses" are invited.

INGERSOLL
STEEL & DISC DIVISION
BORG-WARNER CORPORATION
NEW CASTLE, INDIANA

Plants: New Castle, Ind., Chicago, Ill., Kalamazoo, Mich.

INGERSOLL STEELS

"PRODUCTS OF BORG-WARNER CORPORATION"

Whistle while you shave . . .

Now you can arise <u>every</u> morning knowing that today's and tomorrow's production will be just as satisfactory as yesterday's . . . thanks to WYCKOFF uniformity.

IT TAKES a lot of the "headaches" out of high speed production to have known quality steel and constant uniformity. That's why so many machine tool users are turning to WYCKOFF Cold Drawn Steels.

Once a machine set-up is made, it's good for the job—without adjustment for varying steel. Faster machining, smoother finish, fewer finishing operations like extra facing or grinding, fewer rejections and longer tool-life, speak for WYCKOFF Steel quality.

Just as WYCKOFF Cold Drawn Steel helps take the "pull" out of your shaving in the precision workings of your electric razor—WYCKOFF Steel also removes the "headaches" of production worries in your plant. It's a true servant to the machining industries, why not let it work for you?

DRAWN FROM *Controlled* STEEL

WYCKOFF

DRAWN STEEL COMPANY

First National Bank Bldg., Pittsburgh, Pa.
3200 So. Kedzie Avenue, Chicago, Illinois

Mills at Ambridge, Pa., and Chicago, Ill.
Warehouse Stocks in Principal Cities

Manufacturers of Carbon and Alloy Steels . . . Leaded Steels . . . Turned and Polished Shafting . . . Turned and Ground Shafting . . . Wide Flats up to 12" x 2"

MADE OF
ABSCO
MEEHANITE

32 of these 5,000 lb. castings made of ABSCO Meehanite have been delivered and more are on order.

A SURE TEST of CASTING SKILL

Successful production of these intricate machine castings from ABSCO Meehanite is a tribute both to the ability of our engineers and foundrymen and to the balanced characteristics of Meehanite itself.

ABSCO Meehanite castings are supplied in quantity lots for production parts or singly to individual design.

Through SELECTIVE PROCESSING a grade of ABSCO Meehanite is available to fit your needs for any of these qualities

1. *Combined strength and toughness*
2. *Acid and corrosion resistance*
3. *Abrasion and erosion resistance*
4. *Pressure tightness*
5. *Ability to stand shock and strain*
6. *Intense hardness through chilling or heat treatment*

Write for full particulars to Department A

THE AMERICAN BRAKE SHOE AND FOUNDRY COMPANY

BRAKE SHOE AND CASTINGS DIVISION

FOUNDRY
MAHWAH
NEW JERSEY

OFFICES
230 Park Avenue, New York, N. Y.
332 South Michigan Ave., Chicago, Ill.

newest *in* SOCKETED SCREWS

FLAT HEAD Cap Screws

FOR attaining great rigidity of grip, while retaining flush surfaces of machine parts or assemblies. This socketed screw sets up flush when seated in a regular countersunk hole.

"Pressur-formd" of ALLENOY steel by the process that shapes the steel-fibres to the contour of the screw head by continuous grain-flow; *no cut* fibres. This increases strength for tight set-ups.

"Duo-process" threaded, which makes the axial fibres of the steel conform to the contours of the thread profile. *ALL* of the thread surfaces engage in the tapped hole, ensuring evenly distributed friction-pressure over the entire length of the thread. This increases *holding-power* under vibration.

The screw heads are of uniform diameter, each true and perfectly concentric with the body of the screw. When seated the head engages solidly in the countersink. . . Available (from stock) in 90 standard sizes from No. 4 to ¾". *Ask for descriptive folder* C-25. For other types of socketed screws (*at right*), ask for general folder G-21.

Your local Allen Distributor will oblige with samples and SERVICE.

THE ALLEN MANUFACTURING COMPANY
HARTFORD, CONN., U. S. A.

Pittsburgh COLD HEADING WIRE..

Makes the tough jobs easier!

In plant after plant, the country over, *Pittsburgh* Cold Heading Wire is the increasing choice of those responsible for the production of difficult cold heading jobs *on time, on size,* and "on" cost! The smooth-flowing, dependably uniform qualities of these better wires make *tough* jobs *easier* . . . the unvarying structure, surface, composition, temper, and gauge from order to order assure long, uninterrupted runs! These superior qualities of *consistent* workability result from *Pittsburgh's* 40 years of research and experiment *plus* single organization control from ore to final inspection! A trial of *Pittsburgh* Cold Heading Wire on your toughest jobs will also convince you of its merits for standard production. Inquire today!

PITTSBURGH STEEL COMPANY

1648 GRANT BUILDING **PITTSBURGH, PA.**

Pittsburgh WIRE & WIRE RODS

A complete line for all fabricating needs

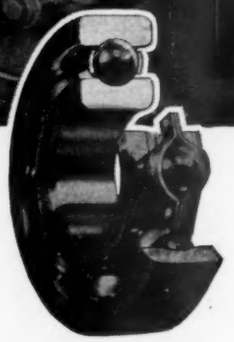
BCA BALL BEARINGS

"insure a silent vibrationless machine capable of running at enormous speeds"

say the makers of SHERIDAN INSERTERS

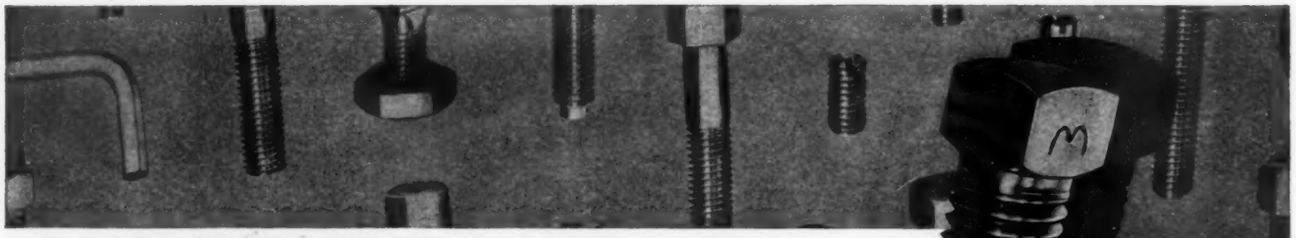
Delivering from 100 to 130 books per minute, this Sheridan Inserter is cutting bindery costs and speeding up deliveries in printing plants throughout the country. Without ball bearings properly engineered for the job it couldn't do the work. We quote from the catalog of the T. W. & C. B. Sheridan Company: "The design embodies a continuous balanced rotary mechanical principle using ball bearings wherever practical. This insures a vibrationless machine capable of running at enormous speeds."

Sheridan is one of many machinery manufacturers who are meeting today's demands for modern high-speed equipment with the help of BCA Ball Bearings.



BEARINGS COMPANY OF AMERICA, 415 HARRISBURG AVE., LANCASTER, PA.

MAKERS OF BCA RADIAL, ANGULAR CONTACT AND THRUST BALL BEARINGS

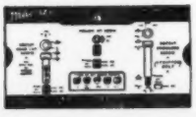


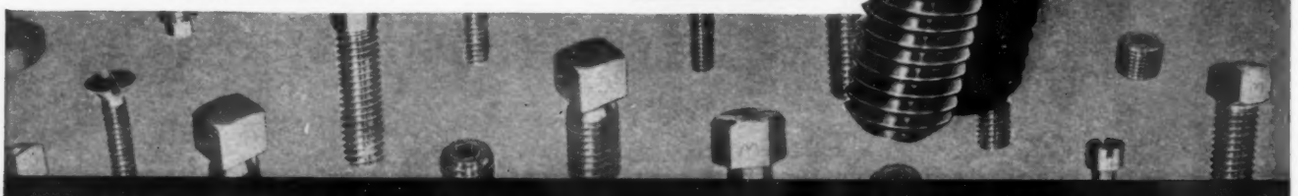
Try MAC-IT Alloy Steel SQUARE HEAD SET SCREWS

Here's three times the gripping power of the same diameter hollow set screw! Where machines take terrific punishment, Mac-it square head sets are used because they offer amazing resistance to upsetting of the points and breakage. It's Mac-its for tough jobs.

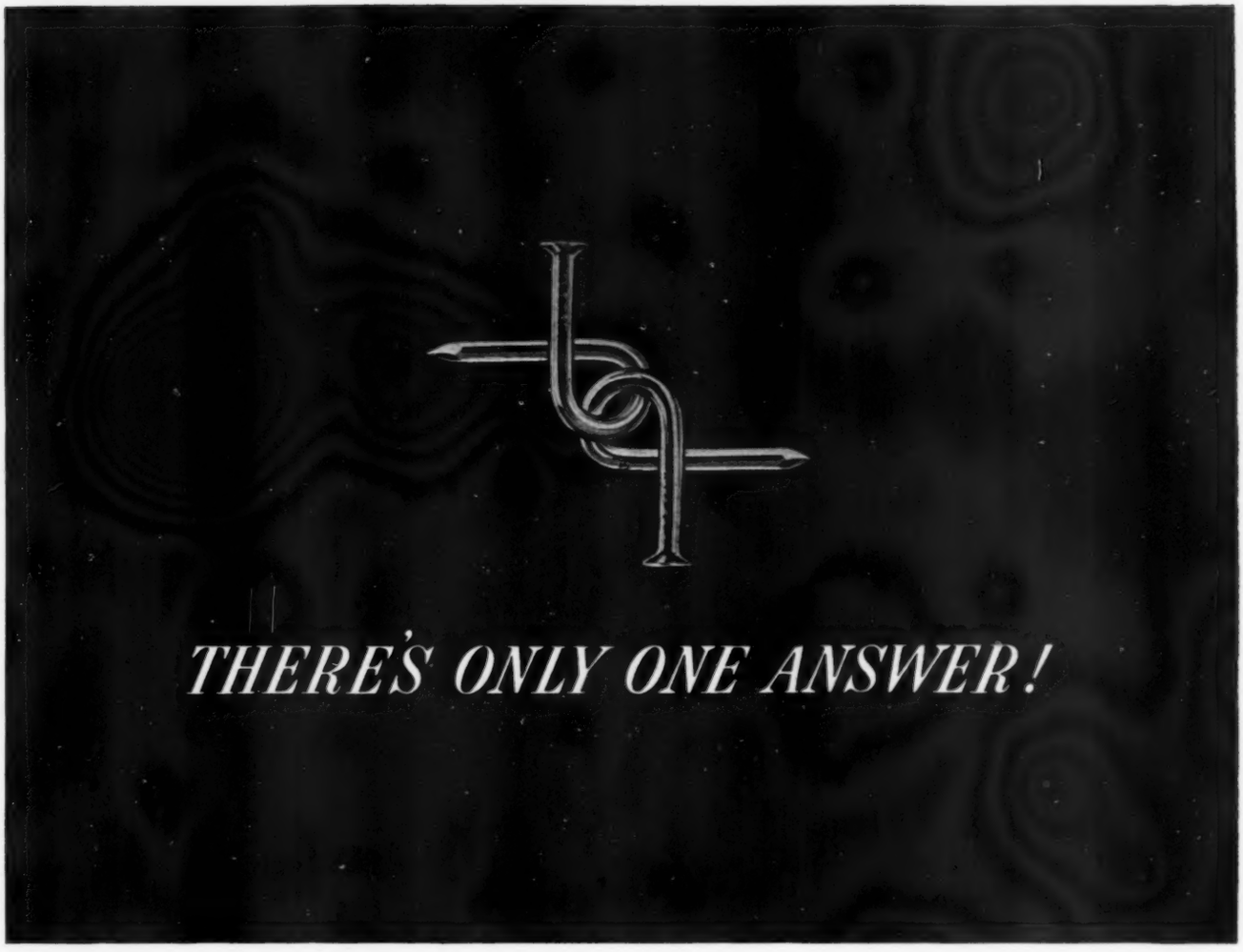
The Mac-it line gives you 16 standard items, including hollow set screws, socket head cap screws and stripper bolts—all milled from solid bars and heat treated.

FREE! Write Dept. A for celluloid slide scale, giving all dimensions on standard Socket Head Cap Screws—Hollow Set Screws—Stripper Bolts.





THE STRONG, CARLISLE & HAMMOND COMPANY
1392 West Third St., Cleveland · Ohio



... and only one answer to keeping bolted parts tight!

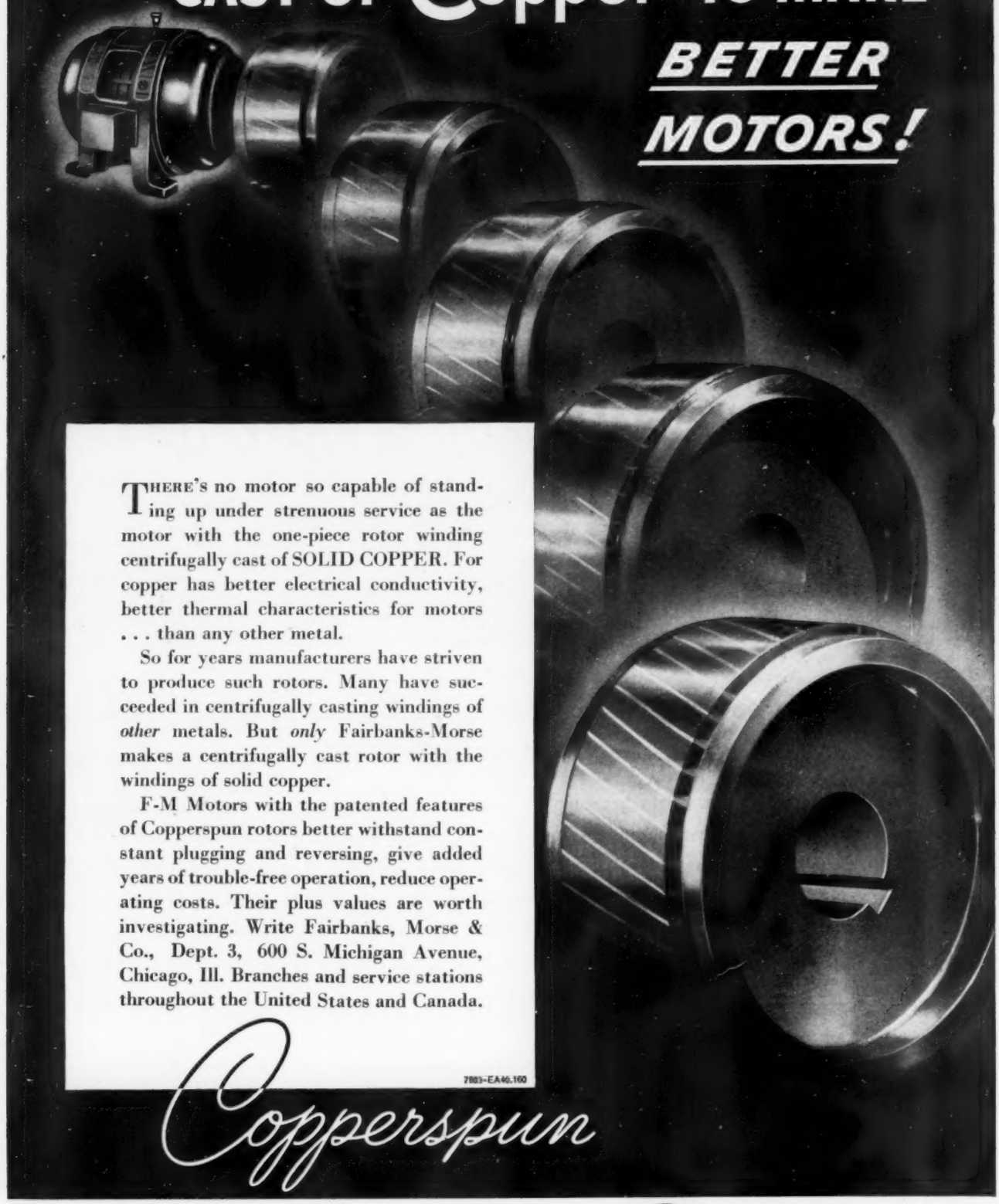
KANTLINK Helical Spring Washers do the job better—*at less cost!*

The puzzle of keeping bolted parts tight has only one answer . . . *maintaining adequate pressure on thread surfaces over a long range.* A nut or screw cannot turn backward on its threads *unless and until* pressure has been lessened by bolt stretch, wear under the nut and bolt head, or pulverizing of paint, rust or scale. A KANTLINK Helical Spring Washer is *the* device that compensates for these causes of looseness by maintaining pressure *over a long range.* It has far more range of action than other so-called locking devices . . . *and it costs less!*

KANTLINK HELICAL SPRING WASHERS • WRIGLEY BUILDING • CHICAGO

Specify KANTLINK Helical Spring Washers

CAST OF Copper TO MAKE *BETTER MOTORS!*



THERE'S no motor so capable of standing up under strenuous service as the motor with the one-piece rotor winding centrifugally cast of SOLID COPPER. For copper has better electrical conductivity, better thermal characteristics for motors . . . than any other metal.

So for years manufacturers have striven to produce such rotors. Many have succeeded in centrifugally casting windings of *other* metals. But *only* Fairbanks-Morse makes a centrifugally cast rotor with the windings of solid copper.

F-M Motors with the patented features of Copperspun rotors better withstand constant plugging and reversing, give added years of trouble-free operation, reduce operating costs. Their plus values are worth investigating. Write Fairbanks, Morse & Co., Dept. 3, 600 S. Michigan Avenue, Chicago, Ill. Branches and service stations throughout the United States and Canada.

7883-EA46.160

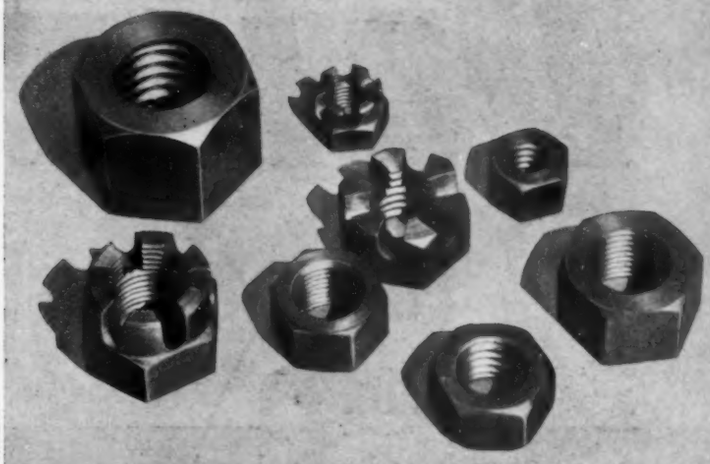
Copperspun

FAIRBANKS·MORSE MOTORS

DIESEL ENGINES ELECTRICAL MACHINERY RAILROAD EQUIPMENT WASHERS-IRONERS STOKERS
PUMPS FAIRBANKS SCALES WATER SYSTEMS FARM EQUIPMENT AIR CONDITIONERS

YOU CAN GET EVERY *Fastening* YOU NEED HERE

Milled and rough Studs are stocked in popular sizes. When physical requirements and raw materials are specified, made to order in production quantities of carbon or alloy steel, or non-ferrous alloys, from ¼-inch to 1½-inch diameters, any length.



As one of the largest producers of nuts, we supply Semi-Finished, Castle, Slotted, Cold Punched, Hot Pressed, Cold Forged, Stove Bolt and Machine Screw Nuts in any quantity from stocks. We make nuts from non-ferrous alloys to specifications.

Lamson full finished Cap Screws of SAE 1020 steel have approximately 90,000 lbs. per sq. in. *minimum* tensile strength. Our high carbon cap screws of SAE 1035 steel, heat treated, have approximately 130,000 lbs. *minimum* tensile strength.

Lamson Set Screws of a special high carbon heat treated steel compare favorably with much higher priced alloy steel set screws in performance. Cost you no more than common low carbon set screws available heretofore.

● *Regardless of what kind* of fastenings you need, you can get them all from Lamson & Sessions, because we manufacture the most complete line of bolt and nut products in this country. *Regardless of the size* of your order, Lamson & Sessions can fill it completely and quickly, because our five plants maintain their own warehouse stocks as well as supplying a nation-wide network of responsible jobbers. It is an obvious economy of time, effort and expense to order every kind of fastening you need—*in one shipment, at one time, on one invoice, from one manufacturer.* Specify Lamson products for *dependable quality* maintained year after year—and *dependable service* in supplying your needs at all times.

●

THE LAMSON & SESSIONS CO., Cleveland, Ohio

75th ANNIVERSARY 1865-1940

Your Jobber stocks the Lamson line

LAMSON & SESSIONS

BOLTS • • NUTS • • COTTERS • • CAP SCREWS • • SPECIALS

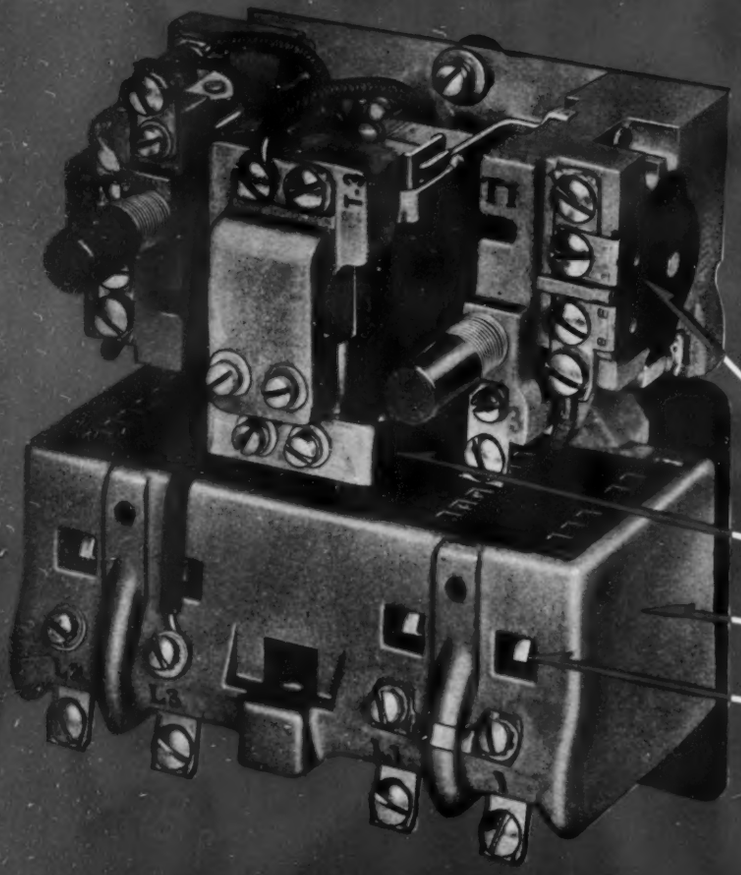
WESTINGHOUSE

"De-ion"

LINESTARTER

DESIGNED FOR EASY INSTALLATION BUILT FOR TOUGH SERVICE

Push-button Operated
—Built-in or mounted separately.



Bi-Metal Overload Protection
hand or automatic reset.

Vertical Operation
prevents accidental closing.

"De-ion" Arc Quencher
prolongs contact life.

Double-break Silver Contacts.

MAGNETIC MOTOR STARTER

CLASS 11-200

Features That Make Installation Quick and Easy

Compact cabinet fits limited space, on machine or separately. Deep-drawn hinged door offers easy access to parts. Ample wiring space. Wiring terminals at front of unit. Concentric knock-outs on top, bottom, both sides. Single screw locks starter in place.

Features That Reduce Maintenance Costs

"De-ion" quenchers prolong contact life by rapid arc extinction—½ cycle. Bi-metal provides accurate, unvarying overload protection. Direct-acting vertical operation—no bearings. Contacts can be inspected without dismantling. Front and back stationary contacts interchangeable. All parts removable from front with screw driver. Non-carbonizing, moisture-resisting arc box.

WESTINGHOUSE ELECTRIC & MFG. COMPANY
EAST PITTSBURGH, PA.

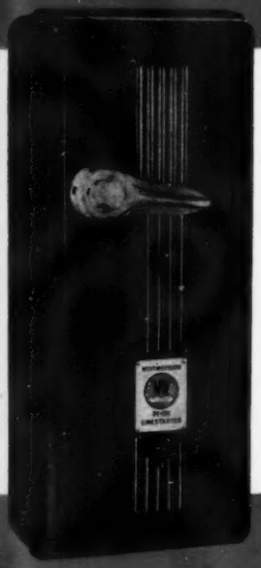
J-21138

Westinghouse

FOR PRODUCTION INSURANCE

buy Westinghouse

TIME SAVERS FOR INDUSTRY

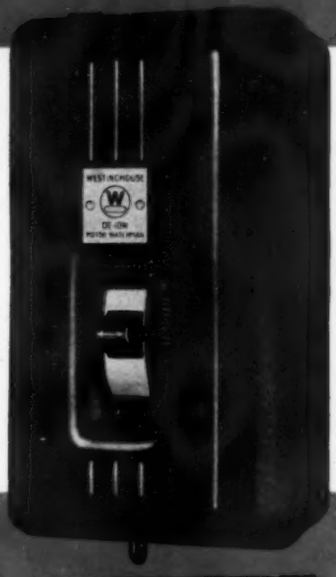


WESTINGHOUSE COMBINATION LINESTARTER

For Motor Control and Circuit Protection

CLASS 11-206

Magnetic motor starter—motor-circuit switch—motor overload protection—nofuze circuit protection—all in one unit. Bi-metal gives permanently accurate overload protection. "De-ion" quenchers protect contacts—save maintenance. Four-in-one Unit saves installation time—saves space—saves wiring—provides greater protection for operators.



WESTINGHOUSE "DE-ION" MOTOR WATCHMAN

Manual Across-the-line Starter for Motors up to 7½ hp.

CLASS 10-100

Quick-make, quick-break toggle action prevents "teasing" contacts. "On," "Off," "Tripped" positions self-indicating. Bi-metal disc overload protection. "De-ion" protection for contacts. Ample wiring space. Rust-resisting parts. Silver contacts. Keyhole mounting for quick, easy installation.

WESTINGHOUSE SAFETY SWITCH

For Circuit Protection

Diamond-pointed break jaw and extended-blade construction prevent burning and beading of contacts. One-piece copper construction saves money by preventing power loss. Quick-make, quick-break on Types A and C. Ample space for wiring. Solderless lugs. "De-ion" arc quenchers on 575-V switches.

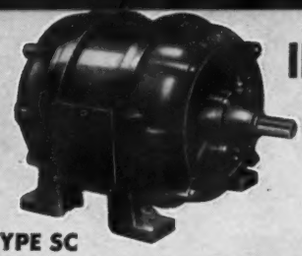
WESTINGHOUSE AB-I BREAKER

For Circuit Protection

Eliminates switch and fuses. Bi-metal overload protection. "De-ion" protection for contacts. Saves maintenance time and production time—circuit outages can be restored by operator. No live parts exposed. Door opens only when switch is in "Off" position. Occupies approximately 40% less space than switch and fuses.

Motors and Control

HOWELL MOTORS—
Safeguard Machine Tool Performance



TYPE SC

TYPE K

INDUSTRIAL TYPE MOTORS
. . . A COMPLETE LINE

For 25 years HOWELL has specialized on polyphase motors for industrial drives. We build these motors with any electrical and mechanical characteristics required, in sizes ½ to 150 HP.

STANDARD OPEN TYPE MOTORS, **Type SC, are recommended for normal service conditions — furnished with either sleeve or ball bearings.**

TOTALLY-ENCLOSED, FAN-COOLED MOTORS, **Type K with ball bearings, are widely used where dusts, fumes or moisture make ordinary open motors short lived. Totally-enclosed feature protects all working parts. Fan cooling prevents overheating in the most strenuous service.**

EXAMPLES OF PRECISION

One in a Series of Advertisements, "HOWELL Motors in the Making" — showing how modern precision standards maintain HOWELL quality.

EVERY PART Must Be Within .0003 Inches
To Get This Man's O.K.

Accuracy is almost a fetish at HOWELL! All parts of a HOWELL Motor are manufactured to the closest practical limits — with EXACTING TESTS made "all down the line" to be sure that every part measures up.

Photograph above shows how shafts and bearing housings are checked for accuracy of dimensions. Johannsen Gauge Blocks are used for setting all inspection gauges, and acceptable tolerances are limited to .0003 inches.

This is typical of the precautions taken at HOWELL in every step of manufacture to insure you the BEST in motor performance, and to provide freedom from drive vibration so necessary to the maintenance of accuracy in machine tool work.

Fast Delivery!

Your motor requirements — are they standard or special? Whatever your needs, the HOWELL organization is sufficiently flexible to meet them EXACTLY, and on time. Write us today, outlining your particular drive problem!

HOWELL ELECTRIC MOTORS COMPANY
HOWELL, MICHIGAN • • • *Representatives in All Principal Cities*

To help put all Metal Working to work on defense:

Col. Willard T. Chevalier, Publisher of Business Week, is authority for the statement that, if the productive capacity of Germany — and its conquests — be considered as 100, that of the United States is 242.

Therein lies our greatest defense weapon — a productive capacity greater than any the world has ever seen before. *But that capacity is effective only if it is producing!*

The Army and Navy are following the wise plan of placing the bulk of defense orders with a relatively small number of large plants. This procedure places upon these companies the problem of locating suitable sub-contractors for parts and assemblies. Much has already been done, but much more remains to be done. Likewise, many plants are in urgent need of equipment for immediate installation and use.

To aid in utilizing *all* of metal-working's productive capacity and existing metal-working equipment American Machinist devotes this section of the 1941 Annual Review & Catalog Number to the three important aids to maximum defense production featured below.

CONTRACT WORK DIRECTORY

A Directory of plants with facilities for sub-contracts, including advertising of leading companies equipped for specific work.

WHERE-TO-BUY DIRECTORY OF *USED* MACHINE TOOLS

Advertising of *used* equipment now ready and waiting for installation and use and advertising of dealers who are in the market for additional equipment for redistribution.

MACHINE-TOOL REBUILDING SERVICE

Advertising of companies which are equipped to rebuild metal-working equipment for owner-users.

Use these facilities in planning your 1941 production. And . . .

LET'S HELP EACH OTHER HELP AMERICA!

ReMANUFACTURED
-(ORIGINATED BY US)-
MACHINE TOOLS

Reg. U. S. Patent Office

HILL-CLARKE MACHINERY CO.

See list below of our

MOTOR DRIVEN NORTON GRINDERS

Guaranteed new machine performance . . . at low cost . . .

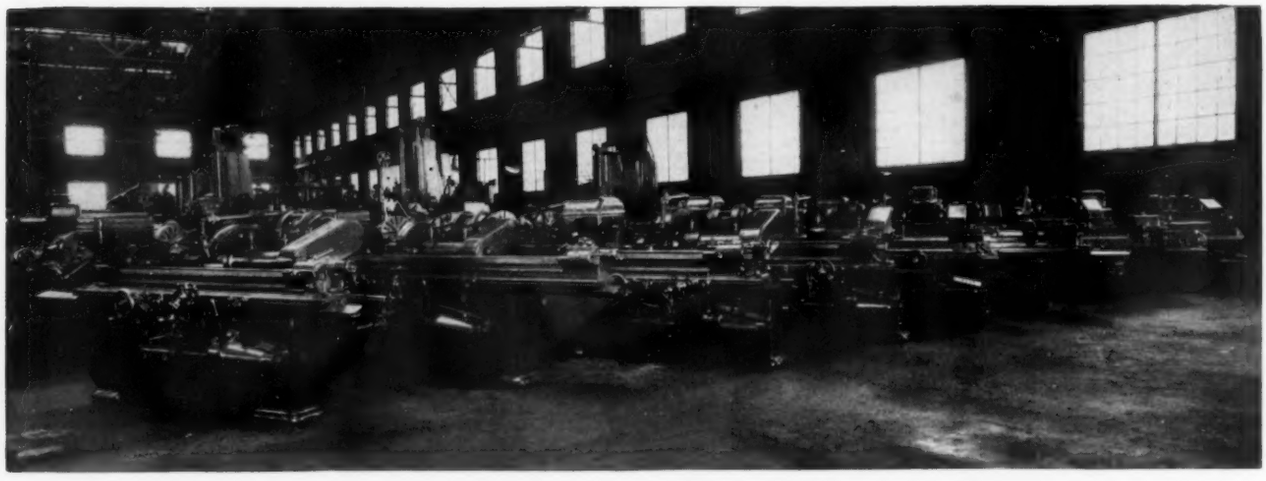
Established 1867

HILL-CLARKE MACHINERY CO. CHICAGO U.S.A.

PRECISION
True alignment of — spindle — wheel slide — and table together with accurate fitting of component parts—insures precision limits of accuracy.

FINISH
Elimination of all gears in work head — results in extremely fine finish.

VIBRATION
Rigid mounting of specially balanced motors—dynamically and statically balanced sheaves—have reduced vibration to a minimum—essential to precision and fine finish.



HOW EXTREME ACCURACY and FINISH ARE OBTAINED:

★ The seasoned bed casting, wheel slide, and table bearing surfaces are planed, indicated, scraped, and lapped enabling a perfect alignment.

The spindle is ground and carefully fitted to its bearing boxes—and then with a wheel mounted on it, run continuously for several days.

Vibration is minimized because specially balanced constant speed motors are used in conjunction with statically balanced sheaves and matched V-belts. These sheaves are also balanced dynamically to suit the individual machine.

The PATENTED MULTIPLE V-BELT DRIVE to work spindle—and a constant speed motor—provide the smooth, continuous rotation necessary for fine finish and precision grinding.

SIZES IN STOCK:

6" x 18" hydr. fd.	14" x 36"
6" x 32"	14" x 50"
	14" x 72"
10" x 18"	14" x 96"
10"-15" gap x 18"	16" x 50"
10" x 24"	16" x 72"
10"-15" gap x 24"	16" x 120"
10" x 36"	18" x 96"
10" x 50"	18"-24" gap x 96"
10" x 72"	21" x 96"
10"-15" gap x 72"	24" x 120"

HILL-CLARKE MACHINERY CO.

Office—651 W. Washington Blvd.

CHICAGO *(Phone Haymarket 7660)* **ILLINOIS**

DIRECTORY OF CONTRACT WORK FACILITIES

BRAZING, Hydrogen
A. H. Hyndman Co., 255 East 95th St., Chicago, Ill.

CASTINGS
Aircraft & Arms Procurement Co., Chimes Bldg., Syracuse, N. Y.
Ajax Iron Works, Corry, Penna.
American Brake Shoe & Foundry Co., New York City (Meehanite)
American Laundry Machry. Co., Rochester, N. Y. (Meehanite)
American Saw Mill Machinery Co., Hackettstown, N. J.
Atlas Foundry Co., Detroit (Meehanite)
Banner Iron Works, St. Louis, Mo. (Meehanite)
Barnett Foundry & Machine Co., Irvington, N. J. (Meehanite)
H. W. Butterworth & Sons Co., Bethayres, Pa. (Meehanite)
Catskill Metal Works, Inc., Catskill, N. Y.
The Challenge Machinery Co., Grand Haven, Mich.
The Cincinnati Millings Machine & Cincinnati Grinders Inc., Cincinnati, O. (Meehanite)
Cooper-Bessemer Corporation, Mt. Vernon, O. & Grove City, Pa. (Meehanite)
Delta-Star Electric Co., 2400 Block, Fulton St., Chicago
Benjamin Eastwood Corp., 300 Straight Street, Paterson, N. J. (Grey-Iron)
Farrel-Birmingham Co., Inc., Ansonia, Conn. (Iron and Steel-Meehanite)
Fleming Foundry Co., Springfield, Mass. (Meehanite)
Florence Pipe Foundry & Machine Co., Philadelphia, Pa. (Meehanite)
Frick Co., Waynesboro, Pa.
Fulton Foundry & Machine Co., Cleveland, O. (Meehanite)
General Foundry & Mfg. Co., Flint, Mich. (Meehanite)
General Pattern Works, 2231 Buck St., Cincinnati, O.
Goodman Mfg. Co., Chicago, Ill.
Greenlee Foundry Co., Chicago, Ill. (Meehanite)
Hamilton Foundry & Machine Co., Hamilton, O. (Meehanite)
Jefferson Machine Tool Co., Cincinnati, O.
Kanawha Mfg. Co., Charlestown, West Va. (Meehanite)
Kinney Iron Works, Los Angeles, Cal. (Meehanite)
Koehring Co., Milwaukee, Wis., (Meehanite)
Lake Erie Engineering Corp., Buffalo, N. Y.
Littlestown Hardware & Foundry Co., Littlestown, Penna.
E. Long, Ltd., Orillia, Canada (Meehanite)
Meehanite Steel Corp., Pittsburgh, Pa. (Meehanite)
North Wales Machine Co., North Wales, Montgomery County, Pa.
Henry Perkins Co., Bridgewater, Mass. (Meehanite)
Pohlman Foundry Co., Inc., Buffalo, N. Y. (Meehanite)
Reliance Steel Casting Co., 28th & Smallman Sts., Pittsburgh, Pa.
Rosedale Foundry & Machine Co., Pittsburgh, Pa. (Meehanite)
Ross-Meehan Foundries, Chattanooga, Tenn. (Meehanite)
W. J. Savage Co., Knoxville, Tenn.
Standard Steel Works Div., The Baldwin Locomotive Works, Philadelphia, Pa. (Steel)
Steacy Schmidt Mfg. Co., York, Penna.
The Stearns-Roger Mfg. Co., Denver, Col. (Meehanite)
Valley Iron Works, St. Paul, Minn. (Meehanite)
Vilter Mfg. Co., 2130 So. First St., Milwaukee, Wis.
Vulcan Foundry Company, Oakland, Cal. (Meehanite)
Warren Foundry & Pipe Corp., Phillipsburg, N. J. (Meehanite)

DIE CASTINGS
Aircraft & Arms Procurement Co., Chimes Bldg., Syracuse, N. Y.
Alemite Die Casting & Mfg. Co., Woodstock, Ill.
American Bearing Corp., Indianapolis, Ind.
Badger Die Casting Co., Milwaukee, Wis.
Doehler Die Casting Co., New York City
Dollin Corp., 600 South 21st St., Irvington, N. J.
Madison-Kipp Corp., Madison, Wis.
Milwaukee Die Casting Co., Milwaukee, Wis.
Mt. Vernon Die Casting Corp., Mt. Vernon, N. Y.
Newton-New Haven Co., West Haven, Conn.
Paragon Die Casting Co., Chicago, Ill.
Parker White-Metal & Machine Co., Erie, Pa.
Phoenix Die Casting Co., Buffalo, N. Y.
Stewart Die Casting Corp., Chicago, Ill.
Superior Die Casting Co., Cleveland, O.
Veeder-Root, Inc., Hartford, Conn.
W. K. Walthers, Inc., 241 Erie St., Milwaukee, Wis. (Lead)

DIE COATING
St. John X-Ray Service, Inc., 30-20 Thomson Ave., Long Island City, N. Y.

FINISHING
Aircraft & Arms Procurement Co., Chimes Bldg., Syracuse, N. Y.
American Shearer Mfg. Co., Nashua, N. H. (Plating)
Delta-Star Electric Co., 2400 Block, Fulton St., Chicago, Ill. (Hot dip galvanizing)
Eastern Tool & Mfg. Co., Bloomfield, N. J.
Littlestown Hardware & Foundry Co., Littlestown, Penna.
Metal Electric Processing Co., 1925 Nebraska Ave., Toledo, O. (Electric brazing)
Philadelphia Rust-Proof Co., 3229 Frankord Ave., Philadelphia, Pa. (Annodizing, parkerizing, bonderizing, sherardizing)

FORGINGS
Aircraft & Arms Procurement Co., Chimes Bldg., Syracuse, N. Y.
American Hollow Boring Co., 1912 Raspberry St., Erie, Pa.
Billings & Spencer Co., Hartford, Conn.
Bay City Forge Co., Erie, Penna.
The Canton Drop Forging & Mfg. Co., Canton, O.
Champion Machine & Forging Co., 2695 East 78th St., Cleveland, O.
Chase Brass & Copper Co., 40 Roland St., Waterbury, Conn.
Herbrand Co., 1300 Stone St., Fremont, O.
Harvey Metal Corp., 74th Street & Ashland Ave., Chicago, Ill.
Lempco-Products-Inc., Bedford, O.
Mondie Forge Co., 10300 Berea Rd., Cleveland, O.
Mueller Brass Co., Riggin & Charles Sts., Port Huron, Mich.
Norris Bros., Inc., Robinson, Ill.
Rockford Drop Forge Co., 2030 9th St., Rockford, Ill.
Standard Steel Works Div., Baldwin Locomotive Works, Philadelphia, Pa.
Transue & Williams Steel Forging Corp., Alliance, O.
Warren Tool Corp., Warren, O.
The D. Wilcox Mfg. Co., Mechanicsburg, Pa.
J. H. Williams & Co., Buffalo, N. Y.

GENERAL MACHINING
Aircraft & Arms Procurement Co., Chimes Bldg., Syracuse, N. Y.
Ajax Iron Works, Corry, Penna.
American Saw Mill Machinery Co., Hackettstown, N. J.
American Shearer Mfg. Co., Nashua, N. H. (Light)
Baldwin Southwark Div., Baldwin Locomotive Works, Philadelphia, Pa. (Large castings)
Bethlehem Mfg. Co., Inc., Bethlehem, Penna.
Breckenridge Machine Co., Cleveland, O.
Buffalo Toy & Tool Works, Buffalo, N. Y.
Carver Div., Murray Co., East Bridgewater, Mass.
Catskill Metal Works, Inc., Catskill, N. Y.
Chas. F. Elmes Engrg. Works, Chicago, Ill.
Farrel-Birmingham Co., Inc., Ansonia, Conn.
Goodman Mfg. Co., Chicago, Ill.
Gould & Eberhardt, Newark, N. J.
The Greist Mfg. Co., 546 Blake St., New Haven, Conn.
Kent Owens Machine Co., Toledo, O.
Kingston Products Corp., Kokomo, Ind.
Lempco Products Inc., Bedford, O.
Littlestown Hardware & Foundry Co., Littlestown, Penna.
Lombard Governor Co., Ashland, Mass.
Midwest Machine Co., 2826 Walnut St., Chicago
Moore Special Tool Co., Bridgeport, Conn.
Munson Mill Machy. Co., 212 Seward Ave., Utica, N. Y.
Charles E. Reed Co., 3227 Carroll Ave., Chicago
Robey Mfg. Co., East Lansing, Mich.
W. J. Savage Co., Knoxville, Tenn.
Steacy Schmidt Mfg. Co., York, Penna.
Taft-Peirce Mfg. Co., Woonsocket, R. I.
Taylor Machine Co., Cleveland, O.
Trumbull Mfg. Company, Warren, O.
Vilter Mfg. Co., 2130 So. First St., Milwaukee, Wis.
Wayne Mfg. Co., Honesdale, Pa.
Wiedemann Machine Co., Philadelphia, Penna.

GRINDING
Ace Hardware Mfg. Corp., 2014 E. Orleans St., Philadelphia, Pa. (Centerless)
Aircraft & Arms Procurement Co., Chimes Bldg., Syracuse, N. Y.
American Shearer Mfg. Co., Nashua, N. H. (Also polishing & buffing)
Bergram Mechanical Engin. Co., Inc., New Britain, Conn.
Cincinnati Ice Pick & Tong Mfg. Co., 118 Burrows St., Cincinnati, O.
Commercial Centerless Grinding Co., 6603 Cedar Ave., Cleveland, O. (Centerless)
Eastern Centerless Grinding Co., 624 Capitol Ave., Hartford, Conn.
Gear Grinding Machine Co., Detroit, Mich.
Hartford Machine Screw Corp., 476 Capitol Ave., Hartford, Conn.
Hartford Special Machy. Co., Hartford, Conn. (Gears, Threads, Cams)
Industrial Centerless Grinding Co., 14640 Schaefer Rd., Detroit, Mich.
Carlyle Johnson Machine Co., Manchester, Conn.
Kingston Products Corp., Kokomo, Ind.
Lempco Products Inc., Bedford, O.
Machinists Tool Grinding Co., 2834 W. Lake St., Chicago, Ill.
Monrad Engineering Co., Portsmouth, O.
Moore Special Tool Co., Bridgeport, Conn.
Phonograph Needle Mfg. Co., 42-46 Dudley St., Providence, R. I. (Pins & needles)

HYDROGEN BRAZING
We are equipped to furnace braze your production runs of small parts.
We can also handle some precision screw machine work.
Excel contact points.
A. H. HYNDMAN CO., INC.
255 E. 95th St. Chicago, Ill.

GRAY IRON—ALLOY—SEMI STEEL
CASTINGS
FROM 15 TO 15,000 LBS.,
ROUGH OR MACHINED.
GENERAL MACHINE WORK.
AJAX IRON WORKS
CORRY, PA.

LIGHT MACHINE WORK
Small well-equipped manufacturing plant is prepared to take on additional light machine work, such as Punch Press, Drill Press, Lathe, Milling Machine, and Bench Work.
A competent staff and low overhead insure quality work at reasonable prices. Your inquiries and blueprints are solicited.
Address
BETHLEHEM MFG. CO., INC.
P.O. Box 464 BETHLEHEM, PENNA.

Grey Iron, Nickel, Chrome and Molybdenum Alloy, Semi-Steel Castings
Superior quality machine or hand molded, sand blasted or tumbled. On good tonnage we will make special molding equipment that will warrant you the best price and most efficient service. Patterns made of wood, brass, aluminum or iron.
Grinding wheel machinery, hack saw machines, Huntington emery wheel dressers and cutters, drill press vises, wire rod cutters.
NORTH WALES MACHINE CO., INC.
Phone 823 North Wales, Montg. Co., Pa.
22 Miles from Philadelphia, Pennsylvania

CASTINGS
Gray iron and alloyed iron. Up to 40 tons. Machine Tool. Pressure and gas tight castings. Complete pattern, machine shop, welding, and pipe bending facilities.
The Vilter Manufacturing Company
2730 S. First Street Milwaukee, Wisconsin

BONIS
Die Coating—Mold Dressing For All Nonferrous Die and Permanent Mold Castings. Write For Circular and Prices.
ST. JOHN X-RAY SERVICE, INC.
LONG ISLAND CITY, NEW YORK

ANODIZING OF ALUMINUM
Sherardizing Parkerizing
Bonderizing
Electro Plating — Cadmium, Zinc, Tin, Nickel, Chromium, etc.
PHILADELPHIA RUST-PROOF CO.
3229 Frankford Ave., Phila., Pa.

MACHINE SHOP WORK
Light and Medium Heavy; also Woodworking Shop. Detailed list of machine tools furnished—or send us your blueprints.
CARVER COTTON GIN CO.
East Bridgewater Massachusetts

DIRECTORY OF CONTRACT WORK FACILITIES

MACHINE WORK AND FINISHING

Use our plant as your branch factory! Production machine and finishing work can be handled quickly and economically by experienced machinists. Factory facilities for:
Light milling, press, and drill press jobs
Hardening and tempering, Polishing and buffing, Chrome and nickel plating
Long experience with hardening and grinding tool steel makes any type machine knives of moderate size a specialty. Also facilities for small forgings. Write today for prompt estimate! Send samples or blueprint if possible.
"SHEARER MADE IS WELL MADE"

AMERICAN SHEARER Mfg. Co.
Established 1865
NASHUA NEW HAMPSHIRE

Heat Treating and Temper
All Tool Steel
With Very Latest Electric
Lavite Furnace Method
Any Size up to 9" by 4"
THE G. M. DIEHL MACHINE WORKS
WABASH INDIANA

KIRK & BLUM
WELDED MACHINE BASES, PEDESTALS and FRAMES
LATHE PANS
GEAR and BELT GUARDS
Pressed Steel Louver Panels and Cover Plates
THE KIRK & BLUM MFG. CO.
2823 Spring Grove Ave., Cincinnati, Ohio

PUNCHINGS STAMPINGS ASSEMBLIES
Quick action on your problem! Use our manufacturing facilities as your branch factory. Well-equipped for small and medium-sized work. Investigate time-saving possibilities *today!* Send prints or samples.
M & M MANUFACTURING CORP.
FORTVILLE, INDIANA

PATTERNS in WOOD and METAL
For All Kinds of Castings, Large or Small
MATCH PLATE WORK A SPECIALTY
Put your pattern problems up to us—we will take care of them—ask the foundries about our work—they use our patterns every day.
GENERAL PATTERN WORKS
2233 Buck Street Cincinnati, Ohio

Porter Machine Co., 3120 Forrer Ave., Cincinnati, O.
Standard Pressed Steel Co., Box 4, Jenkintown, Penna.
Taft-Peirce Mfg. Co., Woonsocket, R. I.
Taylor Machine Co., Cleveland, O.
Wayne Mfg. Co., Honesdale, Pa. (Cylindrical)
Wiedemann Machine Co., Philadelphia, Penna.

HEAT-TREATING
Accurate Steel Treating Co., Chicago, Ill.
Acme Steel Treating Co., Detroit, Mich.
Aircraft & Arms Procurement Co., Chimes Bldg., Syracuse, N. Y.
Air Reduction Sales Co., New York City
American Gas Furnace Co., Elizabeth, N. J.
American Metal Treatment Co., Elizabeth, N. J.
American Shearer Mfg. Co., Nashua, N. H.
Bellis Heat Treating Co., Branford, Conn.
The Bennett Metal Treating Co., Elmwood, Conn.
Chapman Valve Mfg. Co., Indian Orchard, Mass.
Commonwealth Heat Treating Co., Detroit, Mich.
Cook Heat Treating Corp., Los Angeles, Cal.
Dayton Forging & Heat Treating Co., Dayton, O.
G. M. Diehl Machine Works, Inc., Wabash, Ind. (By electric salt bath equipment)
Ex-Cell-O Corp., Detroit, Mich.
Heinzelman's Heat Treating Service, 154 Spring St., New York City
E. F. Houghton & Co., Philadelphia, Pa.
Industrial Steel Treating Co., Oakland, Cal.
Lakeside Steel Improvement Co., Cleveland, O.
Lindberg Engineering Co., Chicago, Ill.
Meisel Press Mfg. Co., Boston, Mass.
O. T. Muehlemeyer Heat Treating, Rockford, Ill.
National Acme Co., Cleveland, O.
National Cylinder Gas Co., Chicago, Ill.
National-Erie Corp., Erie, Pa.
New England Metallurgical Corp., So. Boston, Mass.
Norfolk Hardening Works, Inc., Boston, Mass.
Ohio Heat Treating Co., Dayton, O.
Perfection Tool & Metal Heat Treating Co., Chicago, Ill.
Pittsburgh Commercial Heat Treating Co., Pittsburgh, Pa.
Porter Forge & Furnace, Inc., Everett, Mass.
Porter Steel Treating Co., George H., Cleveland, O.
Queen City Steel Treating Co., Cleveland, O.
Rickert-Shafer Co., Erie, Pa.
Rockwell Co., Stanley P., Hartford, Conn.
C. U. Scott & Son, Rock Island, Ill.
Fred A. Snow Co., Chicago, Ill.
Syracuse Heat Treating Co., 227 Solar St., Syracuse, N. Y.
Standard Pressed Steel Co., Box 4, Jenkintown, Penna.
Strong, Carlisle & Hammond Co., Cleveland, O.
Surface Combustion Corp., Toledo, O.
Taft-Peirce Mfg. Co., Woonsocket, R. I.
Thurner Heat Treating Co., Milwaukee, Wis.
U. S. Tool Co., Inc., Ampere, N. J.
Vincent Steel Process Co., Detroit, Mich.
Wesley Steel Treating Co., Milwaukee, Wis.
Wiedemann Machine Co., Philadelphia, Pa.
Robert Wooler, Philadelphia, Pa.

MACHINE FRAMES, Welded
Aircraft & Arms Procurement Co., Chimes Bldg., Syracuse, N. Y.
General Machinery Corp., Hamilton, O.
Kirk & Blum Mfg. Co., 2823 Spring Grove Ave., Cincinnati, O.
George Koch Sons, Inc., Evansville, Ind.
Lakeside Bridge & Steel Co., Milwaukee, Wis.
Lewis Welding & Engineering Co., 881 Addison Rd., Cleveland, O.
Lukenweld, Inc., Coatesville, Penna.
Mahon Co., R. C., Detroit, Mich.
Steacy Schmidt Mfg. Co., York, Penna.
Trumbull Mfg. Company, Warren, O.

PATTERNS
Aircraft & Arms Procurement Co., Chimes Bldg., Syracuse, N. Y.
American Saw Mill Machinery Co., Hackettstown, N. J.
Chas. F. Elmes Engrg. Works, Chicago, Ill.
General Pattern Works, 2231 Buck St., Cincinnati, O.
Littlestown Hardware & Foundry Co., Littlestown, Penna.
Steacy Schmidt Mfg. Co., York, Penna.
Vilter Mfg. Co., 2130 So. First St., Milwaukee Wis.

PLASTICS, Laminated & Molded
Aircraft & Arms Procurement Co., Chimes Bldg., Syracuse, N. Y.
Auburn Button Works, Inc., Auburn, N. Y.
Boonton Molding Co., Boonton, N. J.
Chicago Molded Products Corp., 1020 N. Kolmar Street, Chicago, Ill.
Consolidated Molded Products Corp., 1940 Thomas Street, Scranton, Pa.
Continental Diamond Fibre Co., Newark, Del.
Erie Resistor Corp., Erie, Pa.
Eclipse Moulded Products Co., 5135 N. 32nd St., Milwaukee, Wis.
Formica Insulation Co., 4672 Spring Grove Ave., Cincinnati, O.
General Electric Co., 1 Plastics Ave., Pittsfield, Mass.
Firestone Tire & Rubber Co., Plastics Div., Akron, O.
Reynolds Spring Co., Plastics Div., Cambridge, O.
The Richardson Co., Lockland, Cincinnati, O.
Jos. Stokes Rubber Co., 322 Webster St., Trenton, N. J.
Universal Plastics Corp., 235 Jersey Ave., New Brunswick, N. J.
Waterbury Button Co., 39 River St., Waterbury, Conn.
Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa.
Worcester Moulded Plastics Co., 9 Grafton St., Worcester, Mass.

PUNCHINGS
Aircraft & Arms Procurement Co., Chimes Bldg., Syracuse, N. Y.
Bethlehem Mfg. Co., Inc., Bethlehem, Penna.
Buddy "L" Co., East Moline, Ill.
Buffalo Toy & Tool Works, Buffalo, N. Y.
Continental Diamond Fibre Co., Newark, Del. (Non-metallic)
Eastern Tool & Mfg. Co., Bloomfield, N. J.
H. Fishlove & Co., 712 No. Franklin St., Chicago, Ill.
Emil Hensle Mach. & Tool Works, 422 First St., Carlstadt, N. J.
M & M Mfg. Corp., Fortville, Ind.
Robey Mfg. Co., East Lansing, Mich.
W. K. Walthers Inc., 241 Erie St., Milwaukee, Wis. (Small)
Wayne Mfg. Co., Honesdale, Pa.

SCREW MACHINE PRODUCTS
Ace Hardware Mfg. Corp., 2014 E. Orleans St., Philadelphia, Pa.
Aircraft & Arms Procurement Co., Chimes Bldg., Syracuse, N. Y.
Ansonia Mfg. Co., 10 River Rd., Ansonia, Conn.
Automatic Screw Machine Prod. Co., 524 S. 2nd St., Milwaukee, Wis.
B & B Specialty Co., Madeira, O.
Bicknell-Thomas Co., Greenfield, Mass.
Blake & Johnson Co., Waterville, Conn.
The Carlyle Johnson Machine Co., Manchester, Conn.
Chase Brass & Copper Co., 40 Roland St., Waterbury, Conn.
Cincinnati Lathe & Tool Co., Cincinnati, O.
Cleveland Screw Products Co., 3056 East 93d St., Cleveland, O.
Continental Diamond Fibre Co., Newark, Del. (Non-metallic)
The Corbin Screw Corp., 1935 Baldwin St., New Britain, Conn.
Davis & Hemphill, Race Road, Elkridge, Md.
Dinsmore & Jager, Northampton, Mass.
Eastern Machine Screw Corp., New Haven, Conn.
The Greist Mfg. Co., 546 Blake St., New Haven, Conn.
Hartford Machine Screw Corp., 476 Capitol Ave., Hartford, Conn.
A. H. Hyndman Co., 255 East 95th St., Chicago, Ill.
Imsande Screw Products Co., 3517 Cardiff Ave., Oakley, Cincinnati, O.
Lempco Products Inc., Bedford, O.
Lombard Governor Co., Ashland, Mass.
Mid-West Screw Prod. Co., 20 St. George St., St. Louis, Mo.
Mueller Brass Co., Riggin & Charles Sts., Port Huron, Mich.
National Acme Co., Cleveland, O.
New Britain Machine Co., New Britain, Conn.
Newton Mfg. Co., Plainville, Conn.
Nicoud Mfg. Co., 1900 N. Kilbourne St., Chicago, Ill.
Olson Mfg. Co., 53 Commercial St., Worcester, Mass.
Wm. H. Ottemiller Co., Pattison St., York, Pa.
The Peck Spring Co., Plainville, Conn.
Peco Mfg. Corp., Hope St. & Indiana Ave., Philadelphia, Pa.
Phonograph Needle Mfg. Co., 42-46 Dudley St., Providence, R. I.
Robey Mfg. Co., East Lansing, Mich.
William Steinen Mfg. Co., 43 Bruen St., Newark, N. J.
Standard Pressed Steel Co., Box 4, Jenkintown, Penna.
Taylor Machine Co., Cleveland, O.
Transue & Williams Steel Forging Corp., Alliance, O.
Waltham Screw Co., Waltham, Mass.
Waltham Watch Co., Waltham, Mass.
W. K. Walthers Inc., 241 Erie St., Milwaukee, Wis. (Hand)
Ware Brothers, 4449 W. Lake St., Chicago, Ill.
Wayne Mfg. Co., Honesdale, Pa.

GREIST PRODUCTS
When you need complete small assemblies, call on Greist! They're our specialty. Quotation furnished promptly on
Screw Machine Products
Stampings
Tools, Dies, Jigs, Fixtures
Short Run Work
Quality work by skilled mechanics is assured. Send blue prints or samples today!
"Greater Savings With Greist"
THE GREIST MFG. CO.
546 Blake Street New Haven, Conn.

DIRECTORY OF CONTRACT WORK FACILITIES

SPECIAL ENGINEERING

Aircraft & Arms Procurement Co., Chimes Bldg., Syracuse, N. Y.
Buffalo Toy & Tool Works, Buffalo, N. Y.
Challenge Machinery Co., Grand Haven, Mich.
The Cimatool Company, Dayton, O.
Earle Gear & Machine Co., 4707 Stenton Ave., Philadelphia, Pa.
Greist Mfg. Co., 546 Blake St., New Haven, Conn.
Indian White Eagle Engin. & Mach. Works, Foot of 18th St., Brooklyn, N. Y.
Kane & Roach Inc., Syracuse, N. Y.
Lake Erie Engineering Corp., Buffalo, N. Y.
W. K. Millholland Machinery Co., Indianapolis, Ind.
National Acme Co., Cleveland, O.
A. H. Nilson Machine Co., 1500 Railroad Ave., Bridgeport, Conn.
Pioneer Engineering & Mfg. Co., 31 Melbourne Ave., Detroit, Mich.
Pool Engin. Co., 514-518 Foresters Bldg., Mason City, Iowa
St. John X-Ray Service, Inc., 30-20 Thomson Ave., Long Island City, N. Y.
Scully Jones Co., Chicago, Ill.
Steacy Schmidt Mfg. Co., York, Penna.
Taft-Peirce Mfg. Co., Woonsocket, R. I.
Worcester Pressed Steel Co., Worcester, Mass.

SPECIAL MACHINERY

Ace Hardware Mfg. Corp., 2014 E. Orleans St., Philadelphia, Pa.
Ackerman Gould Corp., 92 Bleecker St., N. Y. C.
Aircraft & Arms Procurement Co., Chimes Bldg., Syracuse, N. Y.
American Machine & Foundry Co., Second Ave. & 56th St., Brooklyn, N. Y.
Baldwin Southwark Div., Baldwin Locomotive Works, Philadelphia, Pa.
Bicknell-Thomas Co., Greenfield, Mass.
Bock Machine Co., 3618 Colerain Ave., Cincinnati, O.
Breckenridge Machine Co., Cleveland, O.
Buhr Machine Tool Co., 839 Greene St., Ann Arbor, Mich.
Builders Iron Foundry, 1108 Westminster St., Providence, R. I.
Carver Div., Murray Co., East Bridgewater, Mass.
Catskill Metal Works, Inc., Catskill, N. Y.
Challenge Machinery Co., Grand Haven, Mich.
Cimatool Co., Dayton, O.
Cincinnati Lathe & Tool Co., Cincinnati, O.
Cleveland Universal Jig. Co., Cleveland, O.
Columbus Die, Tool & Machine Co., Columbus, O.
Cross Gear & Machine Co., Detroit, Mich.
Denning Mfg. Co., 1775 East 87th St., Cleveland, O.
Doyle Machine & Tool Co., Syracuse, N. Y.
Earle Gear & Machine Co., 4707 Stenton Ave., Philadelphia, Pa.
Chas. F. Elmes Engrg. Works, Chicago, Ill.
Benjamin Eastwood Corp., 300 Straight St., Paterson, N. J.
Farrel-Birmingham Co., Inc., Ansonia, Conn.
Fidelity Machine Co., 3909 Frankford Ave., Philadelphia, Pa.
Ganschow Gear Co., 1013 Washington Blvd., Chicago, Ill.
General Die & Tool Co., 2067 W. 55th St., Cleveland, O.
Globe Tapping Machine Co., Bridgeport, Conn.
Goodman Mfg. Co., Chicago, Ill.
Hartford Special Machinery Co., Hartford, Conn.
Gould & Eberhardt, Newark, N. J.
Emil Hensle Mach. & Tool Works, 422 First St., Carlstadt, N. J.
Howe Machinery Co., 30 Gregory Ave., Passaic, N. J.
H & H Tool & Mfg. Co., 308 E. 3d St., Cincinnati, O.
Indian White Eagle Engin. & Mach. Works, Foot of 18th St., Brooklyn, N. Y.
Kane & Roach Inc., Syracuse, N. Y.
Kent Owens Machine Co., Toledo, O.
George Koch Sons, Inc., Evansville, Ind.
Lake Erie Engineering Corp., Buffalo, N. Y.
Lempco Products Inc., Bedford, O.
Lincoln Machine Co., Pawtucket, R. I.
Link Engineering & Mfg. Co., 1054 W. Baltimore Ave., Detroit, Mich.
Lombard Governor Co., Ashland, Mass.
W. K. Millholland Machinery Co., Indianapolis, Ind.
Monrad Engineering Co., Portsmouth, O.
Moore Special Tool Co., Bridgeport, Conn.
Munson Mill Machy. Co., 212 Seward Ave., Utica, N. Y.
Narragansett Products Corp., 45 Baker Street, Providence, R. I.
A. H. Nilson Machine Co., 1500 Railroad Ave., Bridgeport, Conn.
Oslund Tool & Die Co., 16 Gray St., Hartford, Conn.
Patch-Wegner Corp., 35-41 11th Street, Long Island City, N. Y.
Peco Mfg. Corp., Hope St. & Indiana Ave., Philadelphia, Pa.
Pioneer Engineering & Mfg. Co., 31 Melbourne Ave., Detroit, Mich.
Pool Engineering Co., 514-518 Foresters Bldg., Mason City, Iowa
Charles E. Reed Co., 3227 Carroll Ave., Chicago
W. J. Savage Co., Knoxville, Tenn.
F. B. Shuster Co., 2100 Mill Street, New Haven, Conn.
Snyder Tool & Engineering Co., Detroit, Mich.
Sprout, Waldron & Co., 1400 Sherman St., Muncy, Pa.
Steacy Schmidt Mfg. Co., York, Penna.
Taft-Peirce Mfg. Co., Woonsocket, R. I.
Taylor Machine Co., Cleveland, O.
Udall & Landan Mfg. Co. Inc., 295 Lafayette St., New York City
Vilter Mfg. Co., 2130 South First St., Milwaukee, Wis.
Whiting Corp., 15613 Lathrop Ave., Harvey, Ill.
Wiedemann Machine Co., Philadelphia, Penna.

Manufacturers
SPECIAL MACHINERY
JIG AND FIXTURES
general jobbing and contract work
CHARLES E. REED CO.
3227 Carroll Ave. Chicago, Ill.

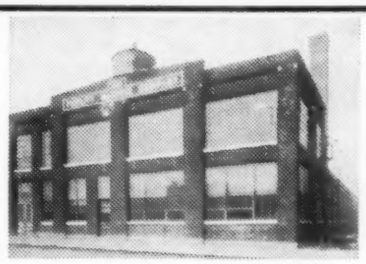
DIES, TOOLS
SPECIAL MACHINERY MANUFACTURERS
Send us your blueprints for estimate
H & H TOOL & MFG. CO.
308 East 3d St. Cincinnati, Ohio

SPECIAL MACHINERY
GENERAL MACHINE WORK
MUNSON MILL MACHINERY CO.
212 Seward Ave., Utica, N. Y.

We solicit your inquiries for design and manufacture of
SPECIAL MACHINERY, FIXTURES and DIES
Including PRESS BRAKE DIES, MACHINE TOOL UNITS or SUB ASSEMBLIES, COMPLETE MACHINES of medium or small size. Materials and quality of workmanship guaranteed.
THE BOCK MACHINE CO. 3618 Colerain Ave. Cincinnati, O.

Send your inquiries for
SPECIAL ENGINEERING WORK
to the
A. H. NILSON MACHINE COMPANY, BRIDGEPORT, CONN.
designers and builders of wire and ribbon stock forming machines.
We also solicit your bids for cam milling

25 Years Experience
MAKING TOOLS—JIGS FIXTURES—SPECIAL MACHINERY
HIGH PRECISION QUALITY PRODUCTION
Large plant—can produce large or small quantities—accuracy guaranteed.
Send samples or drawings for prompt estimate.
DOYLE MACHINE & TOOL CORP.
320 W. Taylor St. Syracuse, N. Y.



Machinists and Engineers
FIDELITY
MACHINE COMPANY
3908-18 Frankford Ave., Phila., Pa.
Jefferson 7600-1-2

SMALL MACHINERY
designed and built to your specifications —also small and medium-sized parts in single lot or small quantities.
Indian White Eagle Engin. & Mach. Works
Established 1920
Foot of 18th St. Brooklyn, N. Y.

STAMPINGS, SPECIAL MACHINERY
Use our facilities to boost your production! Drawing and stamping dies, stampings, special machinery our specialties. Send blueprints or samples for prompt quotation.
EMIL HENSLE
MACHINE AND TOOL WORKS
422 First St. Carlstadt, N. J.

DIES • TOOLS • JIGS • FIXTURES
• Light Stampings • Manufacturing • Special Machinery •
GENERAL DIE & TOOL COMPANY
2067 W. 55th St. WOodbine 4736 Cleveland, O.

Special Machinery, Dies, Tools, Jigs, etc. on Contract
LINCOLN Contract Service
All made exactly to your specifications, at lower cost than you'd expect, and delivered on time. A modern, fully equipped plant at your service. Quotations cheerfully given—send blueprints or samples.
Lincoln Machine Co., Pawtucket, R. I.

DIRECTORY OF CONTRACT WORK FACILITIES

FOR LIGHT OR HEAVY
METAL STAMPINGS

WORCESTER PRESSED STEEL COMPANY
WORCESTER, MASSACHUSETTS
Established 1883

TO HELP YOU!
Our production and design engineers stand ready to shoulder your pressed metal problems. Built by 30 years of varied experience, our die-making facilities, 170 presses up to 1000 ton capacity, assembling and supplementary operations are ready to serve you. Send prints or sample.
THE *Acklin* STAMPING COMPANY
1928 Nebraska Ave. Toledo, Ohio

Non-Metallic
STAMPINGS
PUNCHINGS
SCREW MACHINE PRODUCTS
MOLDED PARTS
SILENT GEARS

FIBRE
BAKELITE
MICA
VULCOID
CELORON
CONTINENTAL DIAMOND FIBRE COMPANY
NEWARK, DEL.

LIGHT
METAL STAMPINGS
Our facilities, plus our experience and ability, guarantees turning out your job **exactly as ordered.** Send us your Blue Prints for quotations on your next job.
DINSMORE & JAGER
Northampton Mass.

CONTRACT WORK
METAL STAMPINGS
Use our plant as your branch factory. Send samples or blue-prints, write today.
BUFFALO TOY & TOOL WORKS
BUFFALO, N. Y.

SWAGING
YOUR SPECIFICATIONS
Phonograph Needle Mfg. Co., Inc.
42-46 Dudley St. Providence, R. I.

STAMPINGS
Ace Hardware Mfg. Corp., 2014 E. Orleans St., Philadelphia, Pa.
Acklin Stamping Co., 1928 Nebraska Ave., Toledo, O.
Acme Metal Goods Mfg. Co., 2 Orange St., Newark, N. J.
Aircraft & Arms Procurement Co., Chimes Bldg., Syracuse, N. Y.
Aluminum Goods Mfg. Co., Manitowoc, Wis.
American Pulley Co., 4200 Wissahickon Ave., Philadelphia, Pa.
Bates Co., H. O., 249 N. Broad St., Elizabeth, N. J.
Bridgeport Brass Co., Bridgeport, Conn.
Buddy "L" Co., East Moline, Ill.
Buffalo Toy & Tool Works, Buffalo, N. Y.
Carrier Corp., Syracuse, N. Y.
Chase Brass & Copper Co., 40 Roland St., Waterbury, Conn.
Collins Supply & Equipment Co., 1355 Monsey Ave., Scranton, Pa.
Continental Diamond Fibre Co., Newark, Del. (Non-metallic)
Continental Machines Inc., 1301 So. Washington Ave., Minneapolis, Minn.
Crosby Co., 183 Pratt St., Buffalo, N. Y.
Dahlstrom Metallic Door Co., Jamestown, N. Y.
Dayton Rogers Mfg. Co., Minneapolis, Minn.
Dinsmore & Jager, Northampton, Mass.
Eastern Tool & Stamping Co., Inc., 39 Ballard St., Saugus, Mass.
Michael Flynn Mfg. Co., 2263 East Allegheny Ave., Philadelphia, Pa.
H. Fishlove & Co., 712 No. Franklin St., Chicago, Ill.
G. & G. Mfg. Co., 2528 Spring Grove Avenue, Cincinnati, O.
General Die & Tool Co., 2067 W. 55th St., Cleveland, O.
Gerding Brothers, Third and Vine Sts., Cincinnati.
Geuder, Paeschke & Frey Co., 1425 W. Paul St., Milwaukee, Wis.
Grand Haven Stamped Prod. Grand Haven, Mich.
The Greist Mfg. Co., 546 Blake St., New Haven, Conn.
H & H Tool & Mfg. Co., 308 East 3d Street, Cincinnati, O.
Emil Hensle Mach. & Tool Works, 422 First St., Carlstadt, N. J.
Heyman Mfg. Co., Michigan Ave., Kenilworth, N. J.
Hunter Pressed Steel Co., Lansdale, Pa.
Kingston Products Corp., Kokomo, Ind.
Kirk & Blum Mfg. Co., 2823 Spring Grove Ave., Cincinnati, O.
George Koch Sons, Inc., Evansville, Ind.
M & M Mfg. Corp., Fortville, Ind.
Master Metal Products Inc., Buffalo, N. Y.
Metalcraft Mfg. Corp., H. K., New York City
Metal Ware Corp., Two Rivers, Wis.
D. J. Murray Mfg. Co., Wausau, Wis.
New England Pressed Steel Co., Washington Ave., Natick, Mass.
Palmer-Bee Co., Detroit, Mich.
Paramount Mfg. Co., Hillsdale, Mich.
Patton-MacGuyer Co., Edgewood Station, Providence, R. I.
Powell Pressed Steel Co., Hubbard, O.
Revere Copper & Brass, Inc., New York City
Richmond Bros. Co., 173-177 Chestnut St., Newark, N. J. (Light & medium)
Robey Mfg. Co., East Lansing, Mich.
Scovill Mfg. Co., Waterbury, Conn.
J. H. Sessions & Son, 290 Riverside Ave., Bristol, Conn.
Standard Pressed Steel Co., Box 4, Jenkintown, Penna.
The Stanley Works, 195 Lake St., New Britain, Conn.
William Steinen Mfg. Co., 43 Bruen St., Newark, N. J.
Sundstrand Machine Tool Co., Rockford, Ill.
Taylor-Shantz, Inc., Rochester, N. Y. (Light to medium)
Transue & Williams Steel Forging Corp., Alliance, O.
Wayne Mfg. Co., Honesdale, Pa.
Whitehead Stamping Co., 1677 W. Lafayette Blvd., Detroit, Mich.
Worcester Pressed Steel Co., Worcester, Mass.
Wrought Washer Co., 2105 S. Bay St., Milwaukee, Wis.

SWAGING
Aircraft & Arms Procurement Co., Chimes Bldg., Syracuse, N. Y.
Norris Bros., Inc., Robinson, Ill.
Phonograph Needle Mfg. Co., 42-46 Dudley St., Providence, R. I.
The Torrington Company, Torrington, Conn.

TOOL, DIES, JIGS, FIXTURES
Ace Hardware Mfg. Corp., 2014 E. Orleans St., Philadelphia, Pa.
Aircraft & Arms Procurement Co., Chimes Bldg., Syracuse, N. Y.

WIRE AND METAL SPECIALTIES
In round, flat, square and special shaped wire and ribbon stock in all metals.
LARGE PRODUCTION CAPACITY
Plating and finishing.
EASTERN TOOL & MFG. CO.
BLOOMFIELD, N. J.

Argus Engineering Co., 1200 Park St., Hartford, Conn.
Bicknell-Thomas Co., Greenfield, Mass.
Bock Machine Co., 3618 Colerain Ave., Cincinnati.
Buffalo Toy & Tool Works, Buffalo, N. Y.
Buhr Machine Tool Co., 839 Greene St., Ann Arbor, Mich.
C. M. Tool & Die Co., Inc., 2823 W. Vienna Ave., Milwaukee, Wis.
Cimatool Co., Dayton, O.
Cincinnati Lathe & Tool Co., Cincinnati, O.
Cleveland Universal Jig Co., Clevelnad, O. (Jigs and Fixtures)
Columbus Die, Tool & Machine Co., Columbus, O.
Denning Mfg. Co., 1775 East 87th St., Cleveland.
Doyle Machine & Tool Co., Syracuse, N. Y.
G. & G. Mfg. Co., 2528 Spring Grove Ave., Cincinnati, O.
General Die & Tool Co., 2067 W. 55th St., Cleveland, O.
Grandahl Tool & Machine Co., 1200 Park St., Hartford, Conn.
The Greist Mfg. Co., 546 Blake St., New Haven, Conn.
H & H Tool & Mfg. Co., 308 East 3d St., Cincinnati, O.
Emil Hensle Mach. & Tool Works, 422 First St., Carlstadt, N. J.
Indian White Eagle Engin. & Mach. Works, Foot of 18th St., Brooklyn, N. Y.
George Koch Sons, Inc., Evansville, Ind.
Lake Erie Engineering Corp., Buffalo, N. Y.
Lincoln Machine Co., Pawtucket, R. I.
Link Engineering & Mfg. Co., 1054 W. Baltimore Ave., Detroit, Mich.
Littlestown Hardware & Foundry Co., Littlestown, Pa.
Lombard Governor Co., Ashland, Mass.
Machinists Tool Grinding Co., 2834 W. Lake St., Chicago, Ill. (Special cutters)
Midwest Machine Co., 2826 Walnut St., Chicago
Monrad Engineering Co., Portsmouth, O.
Moore Special Tool Co., Bridgeport, Conn.
National Twist Drill & Tool Co., Detroit, Mich.
Ohio Tool Co., 3160 W. 106th, Cleveland, O.
Oslund Tool & Die Co., 16 Gray St., Hartford, Conn.
Peters Tool Co., 114 E. Scott St., Milwaukee, Wis.
Pioneer Engineering & Mfg. Co., 31 Melbourne Ave., Detroit, Mich.
Pool Equipment Co., 514-518 Foresters Bldg., Mason City, Iowa
Quality Tool & Die Co., 401 Noble St., Indianapolis, Ind.
Charles E. Reed Co., 3227 Carroll Ave., Chicago (Jigs & fixtures)
Robey Mfg. Co., East Lansing, Mich.
Stanek Tool & Mfg. Co., 2558 North 30th St., Milwaukee, Wis.
William Steinen Mfg. Co., 43 Bruen St., Newark, N. J.
Taft-Peirce Mfg. Co., Woonsocket, R. I.
Wiedemann Machine Co., Philadelphia, Penna.

TOOL DESIGNING
Aircraft & Arms Procurement Co., Chimes Bldg., Syracuse, N. Y.
Argus Engineering Co., 1200 Park St., Hartford, Conn.
Buffalo Toy & Tool Works, Buffalo, N. Y.
The Cimatool Company, Dayton, Ohio
Pool Engineering Co., 514-518 Foresters Bldg., Mason City, Iowa
Singer Engineering Co., 35-37 Ellis Ave., Irvington, N. J.
Taft-Peirce Mfg. Co., Woonsocket, R. I.

WASHERS, Special
Aircraft & Arms Procurement Co., Chimes Bldg., Syracuse, N. Y.
Buffalo Toy & Tool Works, Buffalo, N. Y.
H. Fishlove & Co., 712 No. Franklin St., Chicago, Ill.
H. K. Metalcraft Mfg. Co., 444 West 31st St., New York, N. Y.
Thomas Smith Co., 294 Grove St., Worcester, Mass.
Worcester Pressed Steel Co., Worcester, Mass.

WELDING
Aircraft & Arms Procurement Co., Chimes Bldg., Syracuse, N. Y.
American Tube Bending Co., Inc., 5 Lawrence St., New Haven, Conn.
The Bossert Co. Inc., 1860 Lenox Ave., Utica, N. Y.
Farrel-Birmingham Company, Inc., Ansonia, Conn.
Michael Flynn Mfg. Co., 2263 East Allegheny Ave., Philadelphia, Pa.
Frick Co., Waynesboro, Pa.
Gerding Brothers, Third and Vine Sts., Cincinnati.
Kamis Engineering Co., 3d & Moore Streets, Philadelphia, Pa.
Lewis Welding & Engineering Co., 881 Addison Rd., Cleveland, O. (Heavy equipment)
Mahon Co., R. C., Detroit, Mich. (Plate work)
Master Metal Products Inc., Buffalo, N. Y.
Peerless Welding Co., 335 W. 49th St., New York, N. Y.
Robey Mfg. Co., East Lansing, Mich.
Steacy Schmidt Mfg. Co., York, Penna.
Trumbull Mfg. Company, Warren, O.
Vilter Mfg. Co., 2130 So. First St., Milwaukee, Wis.
Wayne Mfg. Co., Honesdale, Pa. (Spot)
G. E. Wheeler Co., 453 Chapel St., New Haven, Conn.

WIRE SPECIALTIES
Aircraft & Arms Procurement Co., Chimes Bldg., Syracuse, N. Y.
Eastern Tool & Mfg. Co., Bloomfield, N. J.

WHERE-TO-BUY USED MACHINE TOOLS AND SHOP EQUIPMENT

The numbers appearing under a classification identify advertisers so numbered in the Alphabetical Index.

The advertisements of The Cincinnati Machinery & Supply Co., page 382, Laurens Bros., page 386, and Miles Machy. Co., page 400, are not indexed due to late receipt of copy

AUTOMATICS—10, 27, 32, 47, 49, 53, 57, 59, 62, 70

BENDERS and STRAIGHTENERS—19, 47

BOILERS—14

BORING MACHINES
Horizontal—3, 8, 17, 18, 19, 20, 25, 28, 36, 45, 47, 48, 51, 63, 69, 72
Vertical—2, 3, 6, 17, 19, 21, 25, 28, 35, 36, 38, 42, 45, 46, 47, 48, 51, 56, 57, 63, 69, 72

BRAKES—31, 44, 46, 58

BROACHING MACHINES—3

BULLDOZERS—47

COMPRESSORS—14, 34, 36, 45, 46, 55, 57

CUTTING OFF MACHINES—19, 41

DEMAGNETIZER—15

DRILLS and DRILLING MACHINES—3, 5, 8, 10, 17, 21, 25, 27, 27A, 28, 30, 31, 32, 34, 35, 39, 42, 45, 46, 48, 53, 57, 58, 59, 65, 68, 70, 72

ELECTRICAL EQUIPMENT (Motors)—14, 44, 58

ENGRAVING MACHINES—21

FORGING EQUIPMENT—19

FURNACES—19

GAGING and TESTING EQUIPMENT—27A

GEAR CUTTING MACHINERY—3, 4, 17, 21, 25, 27, 28, 30, 33, 39, 41, 45, 45A, 47, 48, 59, 72

GENERATORS—30, 61

GRINDERS—3, 4, 6, 8, 10, 11, 14, 17, 19, 21, 22, 25, 27, 27A, 28, 30, 31, 32, 33, 34, 38, 41, 42, 45, 45A, 46, 47, 48, 50, 51, 56, 58, 59, 62, 67, 68, 69, 72

HAMMERS—9, 36, 45, 46, 47, 57, 72

HOBBERS—10, 11, 30, 32, 41, 45A, 59

KEYSEATERS—21, 45, 57

LAPPERS—19, 27A

LATHES—1, 2, 3, 6, 8, 10, 11, 13, 14, 18, 21, 23, 25, 27, 28, 30, 34, 32, 33, 34, 35, 36, 39, 41, 42, 43, 45, 45A, 46, 47, 48, 51, 53, 56, 57, 58, 59, 63, 67, 68, 69, 70, 72

MATERIALS HANDLING EQUIPMENT (Conveyors, Cranes, Hoists, Lifts, etc.)—14, 19, 25, 44, 45, 47, 60A

METAL WORKING EQUIPMENT (Not Listed)—7, 9, 14, 19, 26, 30, 37, 52, 64, 66, 69, 71, 73

MILLING MACHINES—3, 5, 8, 10, 11, 13, 17, 18, 19, 21, 24, 25, 27, 28, 30, 31, 32, 33, 35, 38, 39, 41, 42, 45, 45A, 46, 47, 48, 51, 53, 56, 58, 59, 70, 72

NIBBLING MACHINES—31, 57, 72

PIPE MACHINES—25, 46, 57, 72

PLANERS—2, 10, 13, 17, 25, 28, 30, 33, 35, 39, 45, 47, 48, 49, 51, 56, 59, 67, 72

PRESSES—3, 9, 10, 17, 18, 19, 21, 25, 29, 32, 33, 43, 45A, 46, 47, 48, 49, 51, 53, 54, 56, 57, 58, 59, 67, 70, 72

PUMPS—14

PUNCHES—17, 25, 31, 45, 46, 47, 57, 72

RIVETING MACHINES—25, 56

ROLLS—17, 45, 56

SAWS—10, 11, 25, 32, 36, 45, 46, 47, 58, 70, 72

SAW TABLES—10, 53

SCREW MACHINES—5, 13, 17, 21, 32, 41, 42, 48, 53, 56, 62, 68

SHAPERS—10, 11, 14, 17, 21, 31, 33, 35, 45, 46, 47, 48, 51, 56, 57, 58, 59, 67, 68

SHEARS—1, 10, 17, 21, 27, 31, 32, 34, 43, 45, 46, 47, 48, 57, 72

SLOTTERS—25, 45, 47, 59

TAPPING MACHINES—6, 20, 25, 59, 67

THREADING MACHINES—3, 21, 41, 46

TRANSMISSION EQUIPMENT—60

WASHING MACHINES—16

WELDING EQUIPMENT—14, 25, 43, 67

WIRE MACHINES—56

MACHINE-TOOL REBUILDING SERVICE

See Ads of Atlantic Machy. Corp., pages 376-377; Machinery Dealers, Inc., page 386; Simmons Mach. Tool Corp., pages 374-375; Joseph Vaillancourt, page 397

Index To Advertisers

The number preceding an advertiser's name is used in Where-To-Buy to identify this advertiser under each classification in which he is offering equipment.

Advertiser's No.	Page No.
1—Acme Equipment Company	396
2—Adelphia Equipment Company	392
3—Atlantic Machinery Corp.	376, 377
4—Bansbach Machinery Corp.	392
5—Barr Machinery Company	395
6—Bauer Machinery Company	394
7—Beal & Company, Joseph	393
8—Bernstein & Company, George M.	396
9—Botwinik Bros., Inc.	388
10—Bradley Machinery Company	385
11—Central Machine Tool Corp.	390
12—Cincinnati Machinery & Supply Co.	382
13—Davis Machinery Company	390
14—Delta Equipment Company	389
15—De Witt Tool Company	394
16—Dony Machinery Company, D. E.	390
17—Eastern Machinery Company, The	378, 379
18—Elyria Belting & Machinery Co., The	392
19—Emerman & Company, Louis E.	390, 392, 393, 394, 395, 396, 397
20—Essley Machinery Company, The E. L.	392
21—Falk Machinery Company	383
22—F. S. 957	394
23—F. S. 970	397
24—F. S. 971	397
25—Ganey Machinery Company	389
26—General Machinery Corp.	396
27—Hasco, Inc.	395
27-A—Hennigson & Co., E.	392
28—Hill-Clarke Machinery Company	368, 391
29—Hyman & Sons, Joseph	397
30—Indianapolis Machinery & Supply Co., Inc.	390
31—Inland Machinery Company	396
32—International Machinery Company	388
33—Interstate Machinery Company, Inc.	393
34—Iroquois Machinery Company	390
35—Jones Machine Tool Company	392
36—Kamis Engineering Company	384
37—Lafayette Machinery Corp.	393
38—Lake Machinery Company	395
39—Lang Machinery Company	397
40—Laurens Bros.	386
41—Lodge & Shipley Machine Tool Co., The	392
42—Lucas & Son, Inc., J. L.	388
43—Lunney, Frank J.	392
44—MacCabe Company, T. B.	386
45—Machine Tool Sales Company	391
45-A—Machinery Dealers, Inc.	386
46—Marr-Galbreath Machinery Company	389
47—McCabe & Sheeran Machinery Company	380, 381
48—McDonald Machinery Company	390
49—Miles Machinery Company	390, 400
50—Modern Auto Repair Company	397
51—Monarch Machinery Company	397
52—Morey Machinery Company, Inc.	384
53—Morris Machinery Company, Inc.	396
54—Moyer, J. N.	392
55—Murray Construction Equipment Co.	397
56—National Machinery Exchange	394
57—O'Brien Machinery Company, The	393
58—Osborne & Sexton Machinery Co., The	395
59—Ott Machinery Sales, Inc.	389
60—Patron Transmission Company	397
60-A—Payne, N. B.	394
61—Robertson Art Tile Company	397
62—Scott Machinery Sales, Inc.	395
63—Segal Machinery Company	396
64—Simmons Machine Tool Corp.	374, 375
65—Strong, Carlisle & Hammond Co., The	390
66—Sun Machinery Company, Inc.	387
67—Toledo Machinery Exchange Company, The	390
68—Toomey Machinery Company, Frank	394
69—Vaillancourt, Joseph	397
70—Victor Machinery Company	396
71—West Penn Machinery Company	392
72—Wigglesworth Machinery Company	387
73—Wolnick Machy. Co., H. F.	399

"WANTED" See Page 399

REBUILT TOOLS

Defense Industries Praise

ENGINEERED REBUILDING

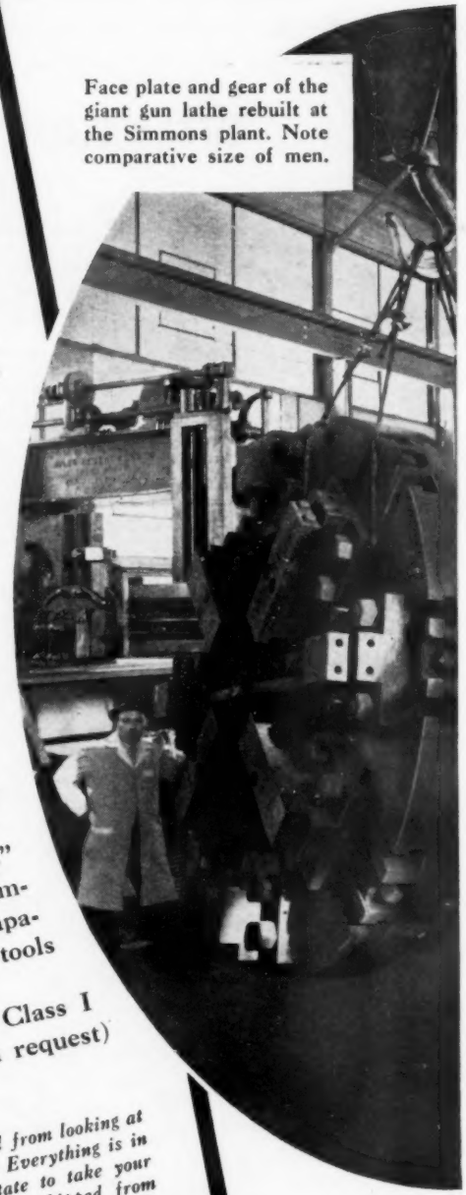
At the end of World War I, a large Eastern steel company stored in its warehouses a number of giant Gun Lathes similar to the one shown at the lower right on the facing page. When the current Defense Program began, these lathes were urgently needed to fill important contracts. Because of their twenty-two years of enforced idleness, however, it was necessary to rebuild them thoroughly before they could be placed into operation...recondition them, replace missing parts and readjust them to modern demands.

They were shipped to the Simmons rebuilding plant in Albany. Each lathe weighs 990,000 pounds and when dismantled for shipment filled ten railroad flat cars. At Albany they were rebuilt from the ground up, as the accompanying photographs show. Today they are doing their part in America's "Front Lines of Production." Similar new tools would have taken many months to complete and would have seriously interfered with delivery schedules.

Daily, Simmons is solving enigmatic "bottlenecks" for key industries with rebuilt machine tools. Simmons is the only rebuilding plant in the country capable of handling, with speed and precision, machine tools of the size and capacity illustrated.

The superintendent of motive power for a Class I railroad (a photostat of letter will be sent on request) recently wrote:

"You certainly did a nice job of overhauling. No one could tell from looking at the machinery that it was not brand new out of the factory. Everything is in jam-up shape and I do not think that anyone should hesitate to take your assurance that any machine will be in first-class shape when shipped from your works."



Face plate and gear of the giant gun lathe rebuilt at the Simmons plant. Note comparative size of men.

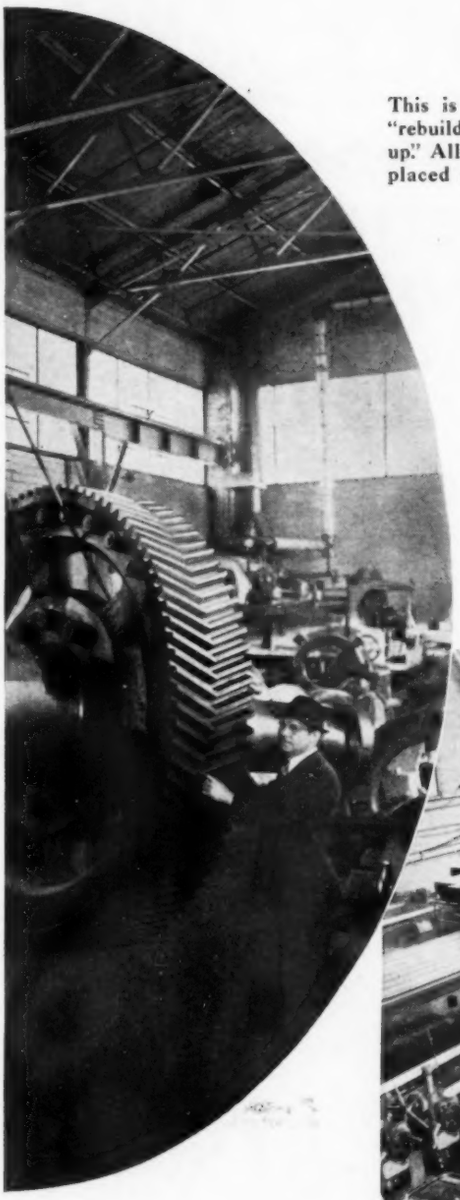
ENGINEERED Machine Tool REBUILDING

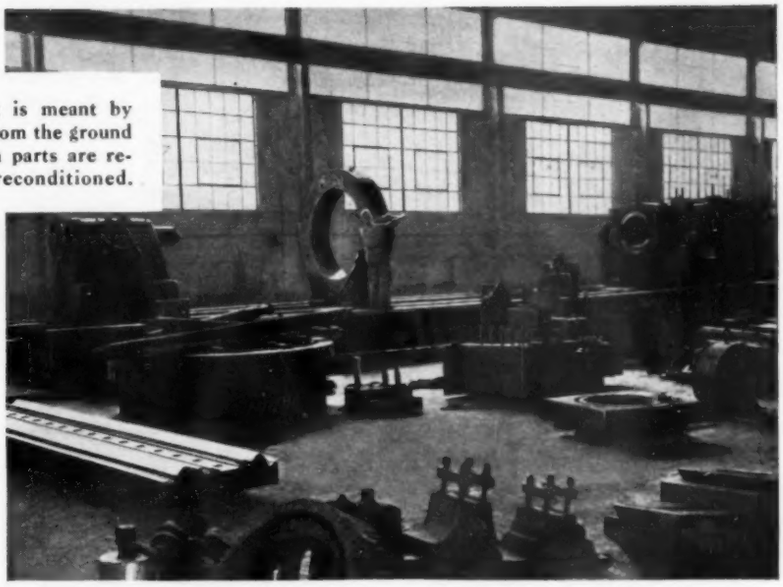
SIMMONS MACHINE

EXPORT OFFICE:
149 BROADWAY, NEW YORK.

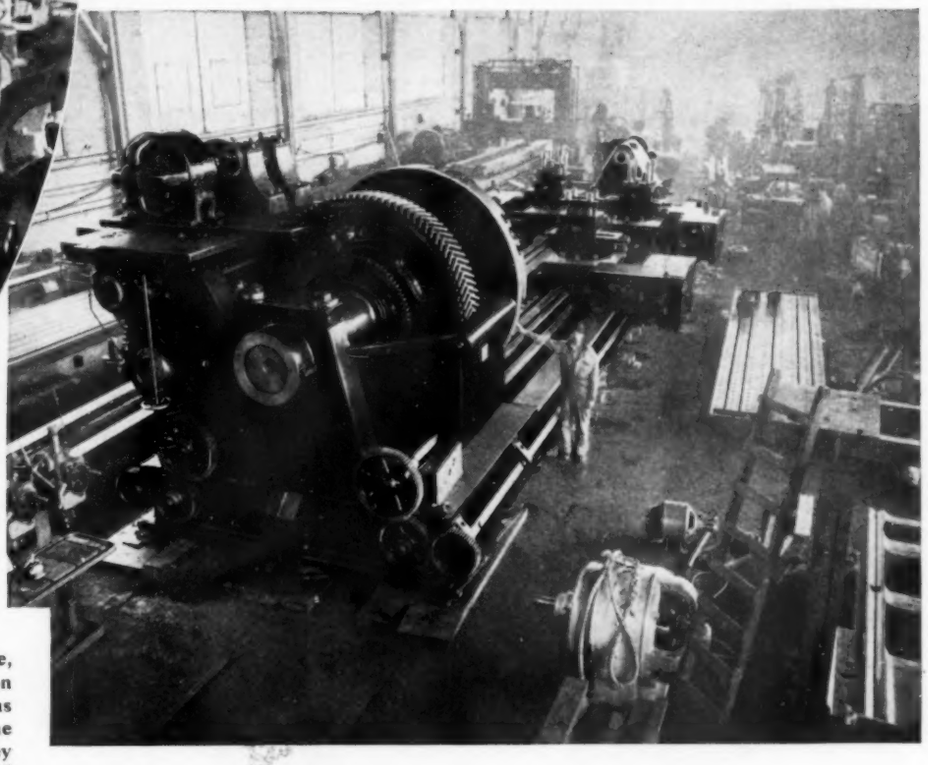
1759 NORTH BROADWAY,

ARE ON THE JOB!...





This is what is meant by "rebuilding from the ground up." All worn parts are replaced and reconditioned.



Here's 990,000 pounds of Gun Lathe, ready to take its place in the production line. Before this tool was shipped it was tested under power and backed with the unconditional guarantee: "Your money back if it does not perform satisfactorily."

TOOL CORPORATION

ALBANY, NEW YORK

PHILADELPHIA OFFICE:
7543 BEVERLY ROAD.

How to get the armament job done the quickest way is still the country's No. 1 problem. In view of the critical state of the world, that problem overshadows all others.

An important part of that problem is to get increased machining capacity in the munitions and aircraft industries. Suddenly the demand for machine tools has descended like an avalanche in devastating fashion.

AMERICAN MACHINIST
DEC. 11TH., 1940

EXPLORE THESE TW VITAL SO

1 PRODUCTION UNITS READY FOR PROMPT DELIVERY

REBUILT BY THE "ATLANTIC" METHOD

BORING MILLS

84" Niles heavy duty, md
72" Niles heavy duty, md
53" Niles heavy duty, md
42" Niles Standard, md
42" Colburn heavy duty, md
42" Bullard Rap. Prod, md
36" Bullard with Side Head
24" Bullard with Side Head
2½" Niles Knee type Horizontal
4-¾" Niles Knee type Horizontal

PLANERS

72" x 72" x 12' Putnam, REV. md. 4 heads
47" x 40" x 12' 6" Gray, 2 heads, md.
42" x 42" x 13' 6" Pond REV. md
36" x 36" x 12' Bickett REV. md
30" x 30" x 12' Whitcomb, 2 heads, md
72" Morton Portable Planer, md

GEAR CUTTERS

60" Gould & Eberhardt Gear Cutter
72" Gould & Eberhardt Gear Cutter
24" Gleason Gear Planer
#6 and #62 Fellows Gear Shapers
#12 Barber Colman Gear Hobbers

MILLERS

#2—A B & S Universal
#3—A B & S Universal
#2—A Garvin Universal
#3 Owen Universal
#2 Van Norman Duplex
#3 B & S Plain
#24" B & S Plain
#2 M. P. & J. Vertical
#5 B & S Vertical
#C Becker Vertical
#6 Becker Vertical
#14 Garvin Vertical
#15 Garvin Vertical
18" Cincinnati Automatic Duplex
24" Cincinnati Automatic Duplex
9" Ingersoll Face Millers
28" Cincinnati Semi-Automatics
60" Garvin #3 Auto-Duplex
37" x 37" x 14' Ingersoll ADJ. Rail
32" x 27" x 9' Ingersoll Adj. Rail

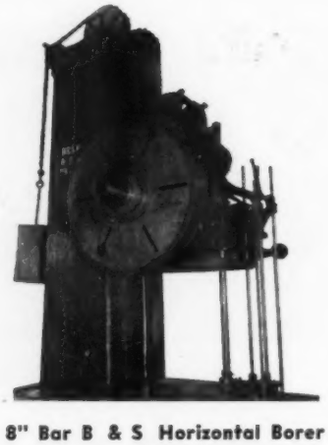
ENGINE LATHES

48" x 36' Fifield Triple-geared
42" x 30' Johnson Geared head
36" x 24' Bridgeford Geared Head
20" x 14' Cisco Geared Head
20" x 14' Wolcott Geared Head
20" x 14' Lodge & Shipley H.S. Prod.
20" x 10' American Geared Head
20" x 10' LeBlond Geared Head
18" x 8' American Geared Head
16" x 14' Lodge & Shipley M.D.
16" x 8' Springfield Geared Head
14" x 6' Prentice geared head
10" x 5' Pratt & Whitney Prod. Lathes

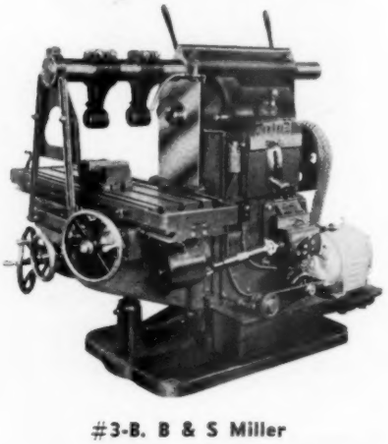
MISCELLANEOUS

8" Stoever Pipe Threader, M.D.
#2 Laponite Double Sp. Broach
3½' American Radial Drill
6" Cincinnati-Bickford Radial Drill
500 Ton NBP Hydr. Carwheel Press
30" x 84" Diamond Face Grinder
#2 Diamond Surface Grinder

#3 Cincinnati H.P. Miller



8" Bar B & S Horizontal Borer



#3-B. B & S Miller

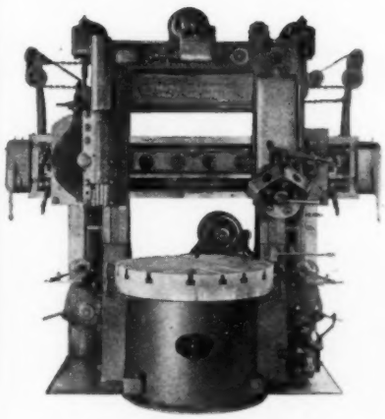
The Tolerances and Accuracy of Our Rebuilt Machines are Unconditionally Guaranteed—

ATLANTIC MACHINERY C

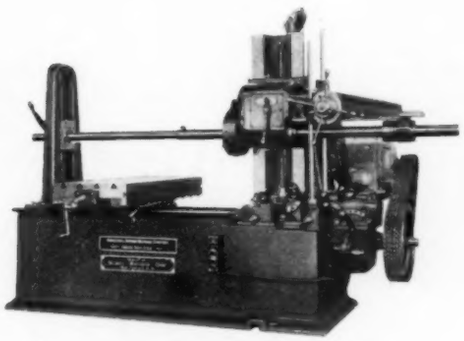
TWO SOURCES TODAY

> Much machinery, though it has seen considerable service, can be rebuilt or retooled for a defense job with a minimum of delay. Plants which can competently put those machines rapidly into shape for the new tasks exist in this country.
>
> AMERICAN MACHINIST
> DEC. 11TH., 1940

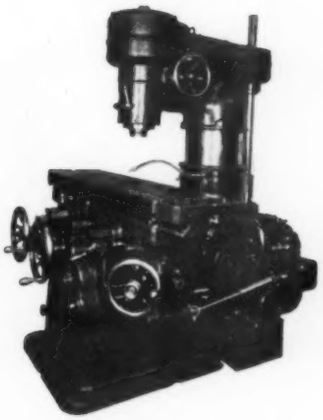
2 WE REBUILD YOUR TOOLS FOR ACCURATE WORK ON TODAY'S TASKS



44" N.B.P. Vert. Bor. Mill.



3" Universal Horiz. Borer



5-C. B & S Vert. Miller

Representative machines rebuilt for various arsenals of Great Britain, Canada, India, Union of South Africa as well as for some of the leading domestic industrial plants.

• *"The job of putting all available machines to work"* means YOUR machines too—*machines now in your shop*—that are not up to the right degree of accuracy in production. You may not want to send us a whole battery of boring mills or milling machines for instance, for rebuilding. BUT you can send *one or two at a time.* A visit to our plant will convince you that the job of rebuilding these machines is done with positive accuracy and with *a minimum of delay.*

Come to our shop — see the work we are doing — see the machines tested under power before shipment — and let us do this same work for you.

CORPORATION

149 BROADWAY, NEW YORK
Tel. WOrth 2-0662 Cable Add: Atmacor

The EASTERN ...At Your

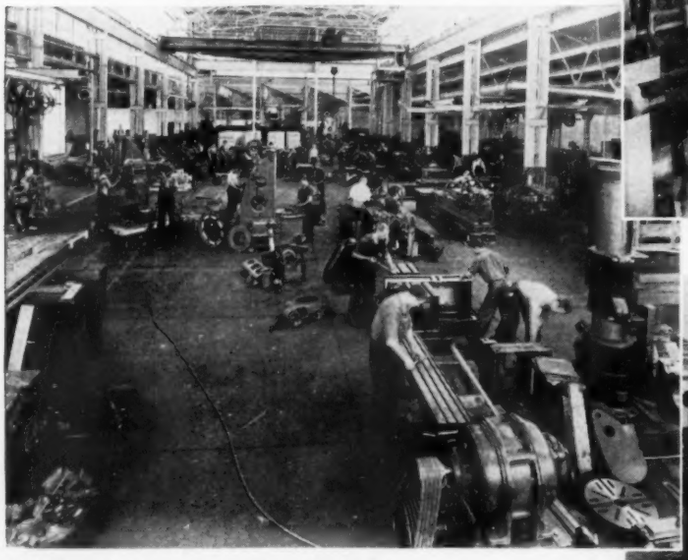
REBUILDING EQUIPMENT IN OUR MODERN UP-TO-DATE PLANT

● The Eastern Machinery Company is "AT YOUR SERVICE" . . . making every effort to provide you with the proper rebuilt machine tools when you need them—NOW!

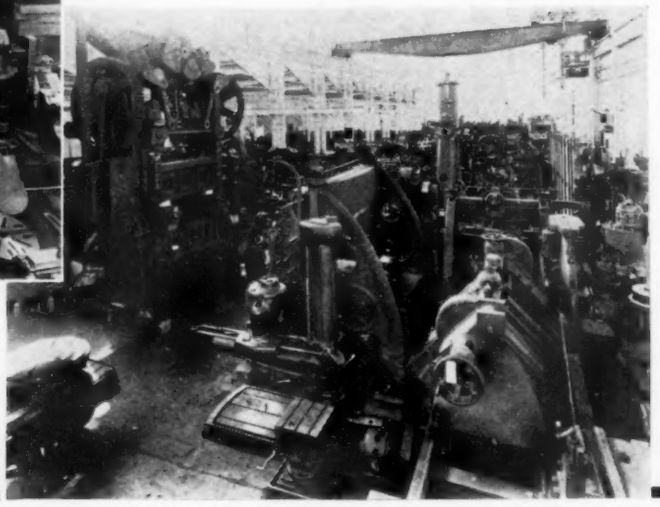
Here are a few views taken in our complete and modern plant, showing a small portion of the men and equipment we have on hand to rebuild tools. Also are shown a few of the units we have available . . . each is fully guaranteed, ready for immediate shipment. At the left is a partial listing of machine tools we can deliver *at once* . . . check your needs. If you don't see what you want, write to us and ask for it! For, when it comes to providing the *right tool* at the *right time*, we're "AT YOUR SERVICE".

LEFT—Exterior view of our plant—*the center of rebuilt machine tool quality.*

RIGHT—Here's one view of a bay, showing hundreds of units—just a few we have on hand, each ready to serve you.



ABOVE—This shows a part of our rebuilding shop. Each man is highly skilled in his special type of work. No unit leaves this floor until its performance features are guaranteed . . . your assurance of satisfaction.



RIGHT—Another view, showing more equipment available at a moment's notice.

MACHINERY COMPANY

Service . . .

TO PROVIDE THE MACHINE TOOLS YOU NEED *Now!* FULLY GUARANTEED . . . AT LOWER COST

EASTERN OFFERS

RADIAL DRILLS
7′ Dreses, gear box, 17″ col.
6′ Fosdick, gear box, 15″ col.
6′ Niles Full Universal, gear box
4′, 5′, 6′ Niles Semi-Universal, m.d.
7′ Fosdick, cone
5′ Prentice, cone
5′ Dreses, gear box, 15″ col.
5′ Cincinnati Bickford, gear box
5′ Bickford, m.d.
5′ American Triple Geared, gear box
6′ American Triple Purpose, d.c. drive
4′ Ryerson, gear box
4′ Dreses, gear box
4′ Hammond Jack Knife
3′ Carlton Sensitive
3′ American Sensitive
2½′ Fosdick, gear box
2½′ Cincinnati Bickford, gear box
2½′ Avey Sensitive

HEAVY DUTY DRILLS
20″, 22″ Barnes All Geared Self-Oiling
22″, 26″, 28″ W. F. & John Barnes
24″, 32″ Aurora
24″, 32″, 36″ Cincinnati Bickford
25″ Superior
25″ Weigel
Nos. 2, 4, 22 Colburn Mfg.
D4 Colburn
No. 310, 314, 315 Baker
3 spindle 20″ Barnes Gang
4 spindle No. 2 Colburn Mfg.
4 spindle No. 2 Foote-Burt
4 spindle No. 4 Foote-Burt
5 spindle 24″ Barnes All Geared Self-Oiling
6 spindle 21″ Hoefer Gang
6 spindle Niles
No. OOS, 1SS Garvin Horizontal
Nos. 2, 3 Baush Multiple rect. head
No. 7D Moline 2 spindle Hole Hog
No. 15HC Fox, m.d.
Nos. 18, 30 Natco, rect. head
No. 14 Natco, rect. head
No. 25 Baush Straight Line
No. 26C Fox Tapper
No. 51C Harrington
No. 220 Baker 2 spindle
Natco 2 way Horizontal Drill & Tapper

PRESSES
Swaine Horning
Waterbury-Farrel S.C., flywheel
No. 1½ Bliss Cam, geared
No. 2S Consolidated O.B.I.
C2 Ferracute O.B.I.
D2, DD2 Ferracute Drawing
P2 Ferracute Stiles Type
No. 5 Bliss Stiles Type
No. 6 Waterbury-Farrel D.C.
No. 16 Bliss Horning
No. 50-4-36 Minster S.S.
S51 Ferracute D.C.
DG53 Ferracute Redrawing
No. 54A Toledo Special
No. 92B Toledo D.C. geared
No. 93A Toledo D.C., geared
No. 94 Bliss Consolidated
No. 496D Toledo D.C. Toggle
No. 268¼ B Toledo D.C. Toggle Drawing

ROLLS
10′ Niles, belt, cap. 1″ plate, drop end housing
24′ Niles, pyramid shipyard type, strong back, steam drive or m.d.

BORING MILLS
30″ Bullard, cone
30″ Gisholt, cone
42″ Gisholt, gear box, 2 heads
48″ Niles-Bement-Pond Car Wheel Borer
52″ Baush, m.d., 2 heads
7′ Niles, cone, 2 heads
10′ Pond, cone, 2 heads
No. 4 Niles-Bement-Pond Horizontal, 5½″ bar
Niles-Bement-Pond Cylinder Borer, 12″ main bar

PUNCHES AND SHEARS
Cleveland Model EF D.E., belt, 36″ throat
Cleveland EF S.E., 36″ throat
No. 3 Hilles & Jones S.E., m.d., cap. 1¼″ thru 1″
No. 6 Long & Allstatter S.E., cap. ½″ thru ½″
No. 6 Long & Allstatter D.E., cap. ½″ thru ½″

CYLINDRICAL GRINDERS
6x32″ Norton, m.d.
10x18″ Brown & Sharpe, belt
10x36″ Landis Integral Cam, m.d.
10x36″ Norton, belt
10x50″ Norton, belted, m.d.
10x52″ Landis, m.d.
10x72″ Landis, m.d.
12x36″ Cincinnati, belt
12″x18″ Cincinnati Plunge Cut, m.d.
12x48″ modern, belted, m.d.
12x72″ Landis, m.d.
16x48″ Cincinnati, belt
16x52″ Landis, m.d.
16x72″ Landis, m.d.
20x144″ Landis, m.d.

CYLINDER GRINDERS
No. 50 Heald, hydraulic feeds
Nos. 55, 60, 65 Heald

DISC GRINDERS
No. 1 Gardner Disc, m.d.
No. 4 Gardner Disc, m.d.
No. 4 Gardner, belt
No. 6 Diamond, belt
No. 6 Gardner, m.d.
No. 20 Gardner B.B. Combination Disc and Roll
No. 51 Besly, m.d.
No. 120 Gardner Combination

SURFACE GRINDERS
Springfield Planer Type, m.d.
18x48″ Diamond L.D. Face, m.d.
30x84″ Diamond H.D. Face, m.d.
Covel Hanchett Knife, m.d.

TOOL & CUTTER GRINDERS
18″ Cincinnati Face Mill, m.d.
Nos. 1, 1½ Cincinnati Universal
No. 1 LeBlond Universal, 2 motor drive
No. 2 Norton, belt
Nos. 4, 5, 41 Oliver Motor Driven Drill Pointers
No. 23 Brown & Sharpe Gear Cutter Grinder
Gisholt Universal, belt
Gleason Cutter Grinder, belt
Gould & Eberhardt Cutter Grinder
Sellers Drill Grinder, m.d.

MILLING MACHINES
No. 5G LeBlond Universal, m.d.
No. 2 Cincinnati Universal, cone
No. 3 Ohio Universal, cone
No. 3H LeBlond Plain, cone
No. 13B Brown & Sharpe Plain, s.p.d.
No. 15 Garvin Plain, cone
No. 25 Becker Plain, cone
No. 22 Garvin Vertical
No. 56-108 Cincinnati Plain Hydromatic, m.d., latest type
C66A Newton 3 spindle Continuous, s.p.d.
Gooley & Edlund Briggs Type
48″ Oesterlein Tilted Offset, m.d.
No. 6 Whitney Hand
24″ Cincinnati Plain Automatic, belt

TURRET LATHES AND SCREW MACHINES
No. 3 Cincinnati Acme Universal, m.d., bar equip.
No. 2 Pratt & Whitney, cone
Dreses Brass Lathe, cone
No. 2 Warner & Swasey, cone
No. 3 Foster, cone
No. 4 Woods Tilted, cone
1″ Biggs, cone
2x24″ Jones & Lamson, m.d., bar
2x26″ Pratt & Whitney, cone
2¼ x26″ Modern, cone
2 spindle Jones & Lamson Steel Head, m.d.
3x36″ Jones & Lamson Geared Head, chucking
3x36″ Jones & Lamson 2 spindle Geared Head, chucking
3x36″ Pratt & Whitney, cone, bar
18″ Libby Type A Geared Head, m.d.
20″ Cincinnati Acme, cone
21″, 24″ Gisholt, cone

GEAR MACHINERY
6″, 11″, 18″ Gleason Straight Bevel, belt
No. 1 Lees-Bradner Gear Hobber, m.d.
No. 3-26″ and 3-36″ Brown & Sharpe, s.p.d.
No. 4-36″, 6-60″, 6-72″ Brown & Sharpe, m.d.
No. 3H Brown & Sharpe, s.p.d.
No. 5A Lees-Bradner, 14″ size
No. 615 Fellows Gear Shaper, helical
No. 7 Fellows H.S. Gear Shaper, m.d.
No. 12 Barber-Colman Gear Hobbers
16″ Cincinnati Gear Hobber, m.d.
36″ Gould & Eberhardt Gear Cutter
Peerless Gear Tooth Rounder, belt
Rochester Gear Tooth Rounder, belt
Gleason Bevel Gear Tester, belt
Gleason Gear Rougher, s.p.d.
Schuchardt & Schutte Gear Tooth Rounder, belt

MFG. LATHES
No. 5 Niles-Bement-Pond Car Wheel Lathe, new
No. 6 LeBlond Multi-Cut
No. 12 LeBlond Automatic, m.d.
Niles-Bement-Pond Quartering Machine, new
3½x36″ LoSwing
3½x60″ LoSwing
8″ Sundstrand Stub
15″x6′ Automatic Threading
18″x8′ Chard Production

PLANERS
72″x48″x12′ Dietrich & Harvey, reversing m.d., 3 heads, box table
60″x60″x12′ Niles, belt, 3 heads, box table
54″x42″x12′ Gray, reversing m.d., 4 heads
36″x36″x10′ Whitcomb-Blaisdell, belt, 2 heads
36″x36″x10′ Cincinnati, belt, 3 heads
34″x24″x8′ Cincinnati, belt, 1 head
32″x32″x8′ Gray, belt, 1 head
30″x30″x10′ Cincinnati, belt, 2 heads
30″x30″x10′ American, belt, 1 head, box table
30″x30″x8′ Pond, belt, 1 head
30″x30″x8′ Gray, belt, 2 heads
30″x30″x8′ Gray, belt, 1 head

CONE HEAD ENGINE LATHES
15″x8′ Sidney
16″x6′ Greaves-Klusman
16″x6′ Rockford
16″x7′ Pratt & Whitney
16″x8′ American
16″x8′ Cincinnati
16″x8′ Monarch
16″x8′ Rockford
18″x8′ American
18″x6′ Schumacher-Boye
18″x8′ Hendey
18″x8′ LeBlond
18″x8′ Mueller
18″x8′ Springfield
18″x10′ Bradford
18″x10′ Schumacher-Boye
18″x14′ LeBlond
19″x12′ LeBlond, taper
20″x8′ American, taper
20″x10′ Davis
21″x8′ LeBlond, taper
21″x10′ LeBlond
21″x16′ LeBlond, taper
24″x10′ Bridgeford
24″x10′ Canada
24″x10′ LeBlond
24″x12′ American
24″x11′ Chard
24″x12′ Schumacher-Boye
24-48″x16′ McCabe 2 in 1
24″x16′ Schumacher-Boye
27″x16′ Bridgeford
28″x14′ LeBlond
36″x10′ Schumacher-Boye

GEARED HEAD ENGINE LATHES
60″x30½′ Niles, s.p.d.
60″x27½′ Niles, m.d., with m.d. carriage
60″x27′ Niles, s.c.m.d.
30″ raised in sand to 36″x22′ LeBlond, int. geared face plate, m.d.
27″x18′ LeBlond, m.d., taper
26″x16′ Bradford, m.d., taper
25″x18′ LeBlond, m.d., taper
24″x18′ Lodge & Shipley Patent Head, taper
24″x15′ Reed, m.d.
20″x14′ Hendey, m.d., taper
20″x10′ American, m.d., taper
20″x8′ American, m.d.
20″x8′ Greaves-Klusman, m.d., taper
18″x15′ Lehmann, m.d., taper
18″x12′ American, m.d., taper
16″x14′ American, m.d., taper
16″x10′ American
16″x8′ American, m.d., taper
14″x6′ Prentice, s.p.d.

SHAPERS
32″ Gould & Eberhardt, gear box
28″ Gould & Eberhardt, cone
28″ Ohio, cone
24″ Gould & Eberhardt, cone
24″ Cincinnati, cone
24″ Barker, cone
20″ Queen City, cone
16″ Davis, gear box

Partial Listing only. Send us your inquiries.

THE EASTERN MACHINERY CO.

1004 TENNESSEE AVE., CINCINNATI, OHIO

"SURE" DELIVERIES

Looking

—and is it "NEW" to you that these "NEW" Machines are available for IMMEDIATE SHIPMENT:

5—"Ex-Cell-O", No. 31, Precision THREAD GRINDERS; complete electrical equipment, motors, etc. Grinding spindles, dial and feed screw; lead screw; nut assemblies; grinding wheels; etc.

2—"Ex-Cell-O", No. 33, Precision THREAD GRINDERS; complete electrical equipment, motors, etc. Grinding spindles, dial and feed screw; lead screw; nut assemblies; grinding wheels; etc.

3—"Ex-Cell-O", No. 35, Precision THREAD GRINDERS; with complete electrical equipment; with grinding wheels; etc.

2—"Ex-Cell-O", Style 2112-A, Precision BORING MACHINES. Motor-driven with pump; carboloy tools, etc.

1—"Ex-Cell-O", No. 218, Precision BORING MACHINE; motor-driven, with carboloy tools, etc.

2—No. 39, "Van Norman" External Automatic RADIUS GRINDERS; motor-driven.

2—"Erco" 75-ton, Hydraulic STRETCHING PRESSES, Type HYSP-75

ALSO — NEW — NEW:

1—No. 35, "Ex-Cell-O" Precision THREAD GRINDING MACHINE. With complete electrical equipment, motor, etc. With wheels, diamonds, etc.

3—"Lees-Bradner" Model 2-HS, GEAR GRINDING MACHINES, double wheel type; for spur and helical gears from 2-in. to 12-in. Complete Electrical equipment, with motor, etc. With racks, grinding wheels, etc.

1—"Erie" No. 24, Geared Tie Rod Frame, TRIMMING PRESS; motor-driven.

3—"Landis" 16-in. x 32-in. Type "D" CRANK PIN GRINDING MACHINES, with hydraulic traverse to carriage. Also one set 25-in. swing crank heads. With headstock drive. With A.C. motors, spare grinding wheels, etc.

9—"Landis" 6-in. x 18-in. Type "C" Hydraulic Plain GRINDERS. Arranged for and including A.C. motor-drive.

2—"Landis" Type "D" 16-in. x 36-in. Plain Hydraulic GRINDERS, with hydraulic power traverse. Complete with and including A.C. motor-drive.

1—10-in. x 36-in. "Landis" Type "DC" Plain Hydraulic GRINDER. Complete with and including A.C. motor-drive.

COMPLETE LIST NOW BEING

You must have Reputation before you can advertise it—42 years of Used Machinery experience is your guarantee of RELIABILITY.

DIRECT ALL INQUIRIES TO OUR NEW YORK OFFICES

"The Used Machinery House Known Everywhere"

McCABE & SHEERAN MACHINERY CORPORATION

(REG. U. S. PATENT OFFICE)

General Sales Offices: 50 CHURCH STREET, NEW YORK Phones: COrtlandt 7-2463 - 7-2464

CABLE ADDRESS—MACSHERAN—NEW YORK

Mc CABE & SHEERAN MACHINERY CORPORATION

Forward—

We invite you to consider this list as typical of the remarkable lists of "USED" Tools that are to follow this year.

You will find here only the most desirable Machines of assured quality and reliability—and at prices more reasonable than you would possibly expect.

10 "POTTER & JOHNSTON" No. 5-A Automatics Single Pulley Drive.

42 INCH SWING — CAR WHEEL LATHE Double-head— Motor-driven "Niles-Bement-Pond".

BIG Vertical Boring Machines

18-24-ft. swing SELLERS Exten. type, 2 hds.
10-ft. swing NILES, 2 hds.
Others—down to 30-in. Swing

BIG Horizontal Boring Machines

12 -in. bar NILES Cylinder Borer
6½ -in. bar NILES "Floor-type"
5 -in. bar BARRETT Cylinder Borer
8 -in. and 5-in. bars 2-spindle Locomotive Cylinder Borer

BIG Engine Lathes

60-in. swing, 34-ft. bed, PUTNAM, blocks to 80"
60-in. swing, 20-ft. bed, NEW HAVEN
50-in. swing, 35-ft. bed, BEMENT
48-in. swing, 18-ft. bed, AMERICAN
42-in. swing, 72-ft. bed, GUN BORING LATHE
42-in. swing, 30-ft. bed, JOHNSON, Taper att.
42-in. swing, 11-ft. bed, ARMATURE and BANDING LATHE
Others—various sizes—down to 14-in. Swg.

BIG Planers

138-in.x84-in.x30-ft. POND, 4 heads
120-in.x72-in.x18-ft. BETTS, 4 heads
96-in.x96-in.x18-ft. POND, 4 heads
48-in.x48-in.x14-ft. DETRICK & HARVEY, Open-side
36-in.x36-in.x12-ft. CHANDLER, 2 heads
Others—down to 24-in. x 6-ft.

BIG Presses

2,000-ton TOLEDO Drawing Press, mtr-dr.
500-ton UNITED Forging, Steam Hydrau.
450-ton WOOD, Hydraulic Flanging
400-ton NILES-BEMENT-POND Hydraulic Wheel Press, Motor-driven

BIG Overhead Electric Traveling Cranes

35-ton PAWLING & HARNISCHFEGER, 38-ft. 4-in. span, 220 volts, D.C.
15-ton SHAW, 46-ft. span, 110 V. D.C. available
15-ton SHAW, 60-ft. span 220 V. D.C.
ELECTRIC HOISTS—
Two 2-ton and)3-ph. 25-cy.
One ½-ton LO-HED)220-volts

FOUR-SLIDE BENDING MACHINE, ⅝-in. cap'y. BAIRD.
PIPE MACHINE 10-in.—STEAM HAMMERS 1,100 and 800-lb.
UPSETTERS 1½ and 2-in.—GEAR CUTTER 36-in.—BOLT THREADER 2-in.—Various sizes of RADIAL, DRILLS—SHAPERS — SLOTTERS — GRINDERS — SAWS — PLATE-SHOP MACHINERY, Punches, Shears, Bulldozers, etc.
ALSO SAND MIXERS—WOOD-WORKING MACHINERY—etc., etc.

FOR SHIPMENT NOW

MADE-UP—WRITE

There is no substitute for EXPERIENCE—and 42 years is a lot of used machinery experience—your guarantee of RELIABILITY

DIRECT ALL INQUIRIES TO OUR NEW YORK OFFICES

"The Used Machinery House Known Everywhere"

McCABE & SHEERAN MACHINERY CORPORATION

(REG. U. S. PATENT OFFICE)

General Sales Offices: 50 CHURCH STREET, NEW YORK Phones: COrtlandt 7-2463 - 7-2464

CABLE ADDRESS—MACSHERAN—NEW YORK

MACHINE TOOLS ARE SCARCE AND PRICES HIGH

But if we have it at all we will give you a buy

LATHES

16" x 6' Monarch Grd Hd. Motor in base
18" x 8' Greaves Klusman Grd Hd. Motor Drive
20" x 10' Rahn Larmon 3 S.C.D. Taper Q.C.
24" x 16' Lodge & Shipley 3 S.C.D. Taper M.D.
36" x 12' Lodge & Shipley Trip. Grd. Q.C.
16" x 6' American Cone drive Q.C.
16" x 9' Lehmann Cone Drive Q.C.
16" x 10' Automatic Threading Lathe
18" x 8' Lodge & Shipley Pat. Hd.
20" x 10' Hendey Q.C. Cone drive
14" x 10' Hendey Q.C. Yoke Hd. Taper
20" x 10' Lodge & Shipley Cone Q.C.
21" x 8' LeBlond H.D. Cone Q.C.
21" x 10' LeBlond H.D. Cone Q.C.
24" x 12' Lodge & Shipley Pat. Head
26" x 48" x 22' McCabe Double Spindle Lathe
28" x 16' Schumacher Boye & Emmes Lathe
36" raised to 53" x 25' Johnson Pl. Change
24" x 12' Bradford Cone drive
18" x 8' Bradford Cone Drive
24" x 12' Schumacher Boye Lathe Cone drive
Sundstrand Stub Lathe

PLANERS

20" x 20" x 4' Pratt & Whitney Planer
24" x 24" x 5' Gray Planer
30" x 30" x 8' Gray Planer
32" x 32" x 10' Woodward & Powell Planer

SHAPERS

20" Stockbridge Cone B.G.
12" P & W Shaper
16" G & E Shaper High Duty
24" Kelly Shaper, B.G.

GEAR MACHINERY

#1 Cross Gear Tooth Rounder
12" Rochester Tooth Rounder
#1, 2 & 3 Adams Gear Hobbers
#6 Fellows Gear Shaper
#12 Barber Colman Gear Hobber
18H G & E Hobber
18HM G. & E Hobber
#3-26" B & S Gear Cutter
#5A Lees Bradner Gear Hobbers

MILLERS

#6 Whitney Hand
#2 Kempsmith Universal Cone drive
#3 Brown & Sharpe Plain Cone drive
#3 Cincinnati Miller Plain Cone drive
#4 Cincinnati Cone drive Plain
#4 Cincinnati Cone drive Universal

GRINDERS

#29-53" Besly Disc Grinder
10 x 24 Landis Plain Grinder
10 x 36 Landis Plain Grinder
12 x 36" Landis Plain Grinder
18 x 96 B & S Plain Grinder
14" P & W Vertical spindle Surface Grinder

PRESSES

#3 Bliss Stiles Type
#18 Bliss O.B.I
#5 Consolidated O.B.I.
P1 & P3 Ferracute Presses
92D Toledo Press
#35 Niagara Presses New

VERT. MILLS

#1 Bickett Cone drive
51" Niles 2 Hds. Cone drive

BOLT CUTTERS

1" Acme Cone drive
2" Acme Cone drive
2" Landis Cone drive
1" National Cone drive
3" Landis Cone drive
2" Oster Pipe Machine
4" Oster Pipe Machine

SAWS

6 x 6 Racine
6 x 6 Peerless
8 x 8 Atkins
12 x 12 Racine

MISCELLANEOUS

C12 Natco Multiple Drill M.D.
20 Spindle National Automatic Mult. Drill
6' x 3/16" Leaf Brake, M.D. D. & K.
8' x 10 Gauge Leaf Brake, M.D. D & K
5A Potter & Johnson Automatic
#1, 3 and 4 LaPointe Broaches
Long & Alstatter Mult. Punch
#5 Long & Alstatter Punch & Shear
#1 Campbell Nibbler
#2 Gray Nibbler
10' x 3/16" Stoll Shear
½" Shuster Rivetter
1½B High Speed Rivetter
#80 Grant Rivetters
#3A and 4A High Speed Rivetters
250# Little Giant Power Hammer
½" Rickett Shafer Radial Tapper
30 K. W. Taylor Spot Welder

CINCINNATI MACHINERY & SUPPLY CO.

217 E. Second St. Cincinnati, Ohio

Like **MAGIC** *You can select it from* **STOCK**

LATHES

8x84 Lo Swing, 2 carriages; Geared Head; S.P.D.
4x60 Lo Swing (Fitchburg); Geared Head; S.P.D.
7x32 Hardinge ¾" collet cap.; floor type
12x5 Willard, Geared Head
12x7 Hendey, cone, Tool Room Lathe
13x6 Pratt & Whitney Model "B"
13x6 Endlund - Mulliner Toolroom Lathe
14x6 Hendey, cone
14x6 LeBlond Geared Head; Taper
14x6 Rockford, cone
14x6 Monarch, cone; draw bar; chuck
14x6 Lodge & Shipley, Q.C.G. cone; chuck
14x6 Lodge & Shipley, Q.C.G. cone
14x10 Hendey, Geared Head
14x8 LeBlond Tool Room; cone, taper; draw bar
16x6 Pratt & Whitney Plain Change; Semi-change
16x6 Lodge & Shipley 12-speed geared head; M.D.
16x6 Lodge & Shipley 3 step cone; dble. back geared
16x6 Pratt & Whitney, taper; cone
16x8 Cincinnati, cone, taper
16x8 Mueller
16x8 Cincinnati, cone; Q.C.G.
17x8 Sidney, cone; Q.C.G.
18x8 Mueller, cone; Q.C.G.
18x8 Chard
18x6 Monarch Q.C.G. cone
18x8 Cisco, cone; Q.C.G.
18x8 Hamilton; Q.C.G. taper, cone
18x12 Prentice Plain Change; taper
18x12 Hamilton Plain Change, chuck
19x8 LeBlond Production, cone, Q.C.G.
21x8 LeBlond Turret Attach. on cross slide
24x12 Crawford-Erie, Q.C.G. cone
24x16 Lodge & Shipley Q.C.G. cone; arr. M.D.
26x9 Bridgeford, cone; Dble back geared; cone
26x16 Greaves - Klusman Plain Change Gears
42x18 Gleason triple geared; face plate; plain change, cone

LATHES, AUTOMATIC

Hartness Automatic Lathe for chucking; with Air Chuck; made by Lamson. Size: 12x6; arranged motor drive less motor

TURRET LATHES & SCREW MACHINES

Warner & Swasey #2, G.F.H. Hollow Hex. Turret
Warner & Swasey #1, G.F.H. Hollow Hex. Turret
Foster #7 G.F.H.; P.F.T.; cross slide
Foster #1; ⅝" capacity
Foster #2 Geared friction Head; P.F.T.
Warner & Swasey #2 Geared Friction Head; Wire feed (3)
Warner & Swasey #2 Plain Friction Head
Pratt & Whitney #1, ⅝" Hand Screw Machine
Brown & Sharpe #1 Hand Screw Machine; wire feed
Brown & Sharpe #2 Hand Screw Machine; wire feed
Bardons & Oliver #5 Fox, 20" swing Turret Lathe; P.F.T.; grd. friction head Thread Chasing Attach.; cross sliding turret
Dreses-Fox Turret Lathe; Thread Chasing Attach.; cross sliding turret
Jones & Lamson 2¼"x24 (2)
Jones & Lamson 3x36 (3)
Bardons & Oliver #1; 5/8" collet cap. Hand Screw Machine
#4 W&S, geared friction head; Air Chuck; Pan; Oil Pump
Gisholt 24"; also 21"

SHEARS

10'x3/8 Waiss & Roos Plate Shear
6'x¼" Niagara #6E
4x3/16 Niagara #748
42"x16 ga. Stoll #142
36"x16 ga. Stoll #136
36"x14 ga. Stoll #236
#1 Buffalo Universal Ironworker
#0 Buffalo Bar Shear
#1 Pels Universal Ironworker, Hand
#208 Niagara Circle Shear & Flanger

DRILLS

Baker #121, Motor Drive
Colburn #2, Motor Drive
Barnes 3-spindle Hole Hog #5
Avey #3 "Aveymatic" 2-spindle
Avey #3 with Tapping Head on Spindle
Avey #3, 24" table, 12" overhang
#12 Natco Multiple Spindle, also #11
Hundreds of single, two, three and four spindle Drills in Stock.

RADIAL DRILLS

6' Niles-Bement-Pond
4' Bickford; 4' N.B.P. Semi-Universal
4' Dreses
3½' Silver;
3' Dreses; 3' Bickford;
3' Dreses Simplex
3' Carlton, Sensitive
2½' Fosdick

MILLERS

#0 Van Norman (2)
#½ Van Norman (4)
#1 Van Norman
#2 Van Norman
#3 Cincinnati, Universal
#2 Kempsmith, Universal
#4 Cincinnati, Universal; Gooseneck overarm, belt feed
#1½ Rockford, Plain
#13-B Brown & Sharpe, Production
#1½ Brown & Sharpe, Plain
#12 Brown & Sharpe, Production
#1 Kempsmith
#00 Brown & Sharpe; Hand
#6 Whitney, Hand
#4 Burke, Bench, Power Feed
#3 Burke, Bench
#5 Stark, Precision. Bench, Hand; ¾" collet (4)
#4 Stark, Precision, Univ., bench; ⅝" collet
#2 Pratt & Whitney Spline Miller
#6 Jackson Die Sinker or Vertical Miller; Q.C.G. Box; arranged motor drive

PRESSES

#4 Bliss Dble. Crank; 42x36; 3" stroke; Plain Flywheel
#1 Bliss Toggle; Draw & lift out up to 3¼"
#21½ Bliss Geared OBI
#20, #19C, #19, #18 Bliss, OBI
#14 Toledo Horn
#42 V&O Horn
#75 Toledo Geared, Open Back
#30 Bliss Arch Press
#50 Perkins Dble. Crank Gap Frame, Plain Flywheel
#25 Niagara Arch
#42Williams & White 10' Multiple Punch
#702 Bliss Flat Trimming Presses
#2 Billings & Spencer Trimming Pr.
6-ton General Flexible; also 12-ton Fox Flexible
25-ton Henry & Wright High Speed Dieing Press
350-ton Hydraulic Wheel Press
#46 Perkins Geared Back Flywh.
#36 Niagara Plain Back Flywheel

SHAPERS

34" G&E, motor drive
28" G&E Invincible; cone
26" Smith & Mills, cone
24" G&E High Duty; cone
24" Kelly, cone
24" G&E, S.P.D. Hi Duty
24" Cincinnati, cone
20" Mattison, cone
20" Cincinnati
20" Kelly
16" G&E Hi Duty, cone (2)
16" Smith & Mills
16" Steptoe, cone (2)
16" Stockbridge

KEYSEATERS

#3 Baker, 72" capacity
#1 Davis (2)

THREAD MILLER

4½" x 12" Pratt & Whitney

GRINDERS

Norton 14x50 Plain
Cincinnati 12x36 Plain, motorized
Brown & Sharpe #10 Plain
Fitchburg 8x20 Plain; hand feed
Brown & Sharpe #14, 10"x48" between centers
Landis #3 Universal 12x36
Cincinnati #3 Universal
Rivett #103 Universal
Wilmarth & Morman #3 Surface Grinder
Diamond #1 Hand Surface Grinder
Diamond 12x12x24 Surface Grinder; M.D.
Brown & Sharpe #2, 6x18 Surface Grinder
Pratt & Whitney 12x36 Surface Grinder; vert.
Gardner #7 Disc & Ring Wheel 40", B.B.
Gardner #4 Disc Grinder; 26" discs; Univ. Table
Badger 12" disc Grinder Dble. End; B.B. Univ. Table

GRINDERS, INTERNAL

Churchill (Worcester) Internal Grinder
Brown & Sharpe #22
Rivett #6
Bryant #15A Internal and Face Grinder

GRINDERS, ROTARY

Heald 20"—12"
Persons-Arter 8"
Heald Ring, 7½"

GRINDERS—TOOL & CUTTER

#1 LeBlond with power feed, like new
#1½ Cincinnati
#1 Greenfield like new (2)
#2 Walker
#2 Norton, complete
Also Double End Floor Grinders—All Sizes

BORING MILLERS

Bullard "New Era" 36" Vertical Turret Lathe
Bullard "New Era" 24" Vertical Turret Lathe

ENGRAVER

#3 Zeiss, arranged for flat and roll work

FALK MACHINERY CO., INC.
Machinery Merchants
18 WARD STREET, ROCHESTER, N.Y.

REMOVE THE BOTTLENECK WITH

Rebuilt Machine Tools!

One of the bottlenecks of defense production is the lack of new machine tools in sufficient quantity. This bottleneck can be lessened—and in some cases removed—by good rebuilt machines.

Morey's rebuilding department rebuilds machine tools from the frame up, and restores the quality and productivity that were built into the machines by the original manufacturers.

Morey will be glad to cooperate in supplying your requirements of reliable rebuilt tools. These will help you as effectively as new tools to proceed with your defense production.

Tell us what you need!

MOREY MACHINERY CO., INC
410 BROOME ST., NEW YORK

OUTSTANDING TOOLS — LIQUIDATING AT ONCE

BRIDGEFORD CENTER DRIVE AXLE LATHE Will take up to 12"x8' axles

48" MESTA SLIDING FRAME COLD SAW FRICTION TYPE

LATHES

1—**Lodge & Shipley** 24"x14' Geared Head.
1—**Lodge & Shipley** 18"x8' Geared Head
1—**Lodge & Shipley** 24"x12' Geared Head
1—**Sebastian** 16"x10' Geared Head.
1—**Walcott** 24"x10' Motorized Q.C.G.
1—**Le Blond** 20"x8' Gap Motorized Q.C.G.
1—**Le Blond** 19"x8' Motorized Q.C.G.
1—**Hamilton** 14"x8' Motorized Q.C.G.
1—**Mullner** 14"x6' Motorized Q.C.G.
1—**National** 15"x10' Motorized Q.C.G.
2—**Champion** 16"x18' Geared Head
1—**Prentice** 18"x8' Geared Head
1—**Gleason** 48"x14' Internal Dr. P.C.G.
1—**Gage** 100" swing, 20' bed, raised P.C.G.

HAMMERS

1—**Chambersburg** Steam Hammer—1500 lb. Gap Type.
3—**Chambersburg** 400 lb. Board Drop Hammer.
1—**Chambersburg** 150 lb. Board Drop Hammer.

COMPRESSORS

2—**Gen. Electric** Centrifugal type T-1, 1.5 lb, form A, 3450 R.P.M.

BORING MILLS

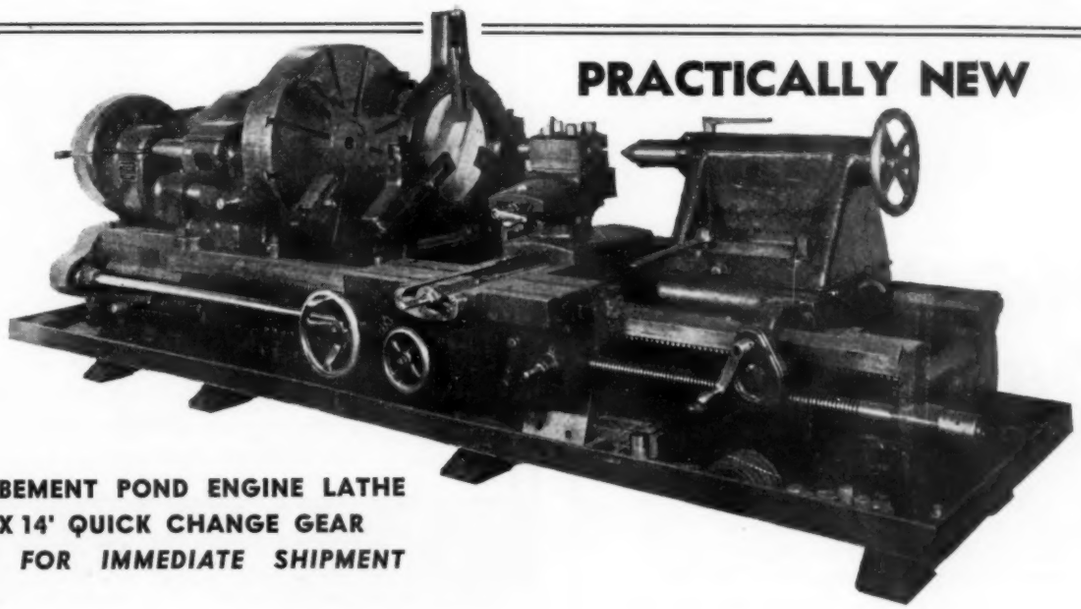
1—42" **Bullard** Turning Mill, motor drive, 2 heads on rail.
1—72" **Bickford** Vertical Mill B.D.
1—**Sellers** Car Wheel Borer.
1— 5" **Barrett** Horizontal Boring Mill.

KAMIS ENGINEERING CO.
302 Moore St. PHILADELPHIA, PA. Howard 8474

2—54" BULLARD BORING MILLS NEW ERA TYPE

MODERN EQUIPMENT

Every item in our Detroit Stock



PRACTICALLY NEW

NILES BEMENT POND ENGINE LATHE
36" X 14' QUICK CHANGE GEAR
READY FOR IMMEDIATE SHIPMENT

LATHE
14" X 6" AMERICAN
MOTOR IN BASE

ATTENTION:
WE HAVE ESTABLISHED OUR OWN REBUILDING SHOP AND CAN QUOTE ANY OF THESE MACHINES
AS IS or REBUILT

AUTOMATIC
2—MODEL G ⅞ GRIDLEY'S

LATHES
14"x6' American, motor in base
13"x5 Champion
20"x8' Lodge & Shipley, MD
24"x10' South Bend, MD, taper
16"x6' South Bend
16"x8' Reed
36"x14' Niles Bement Pond Engine
16"x6' Chard Production
20"x9' American

TURRET LATHES
21" Gisholt
24" Gisholt
#2 Bardons & Oliver
#4½ Bardons & Oliver
20" Acme
#2 Foster
2x24 J and L

DRILLS
Allen 6-spindle 14" MD
24" Superior, sliding head
20" Barnes

MISCELLANEOUS
Doty Bar Shear (new)
8' Stoll Shear
18" Gould & Eberhardt Gear Hobber
Garvin Cam Cutter
#63 Consolidated Press
Garvin Mills
Prosser Grinders
#00 Brown & Sharpe Automatic MD
Ohio Planer
#6 Brown & Sharpe Turret Lathes (2)
Whipp Openside Planer
Saw Table
Band Saw 32"
Vertical Heads
Dividing Heads
Park Comb. Woodworking Machine

AUTOMATICS
two Model G ⅞" Gridleys
one #4¼ Model G Gridley S.S.
New Britain 1⅝"x7
New Britain 1"x5
⅞" Cleveland, Model B

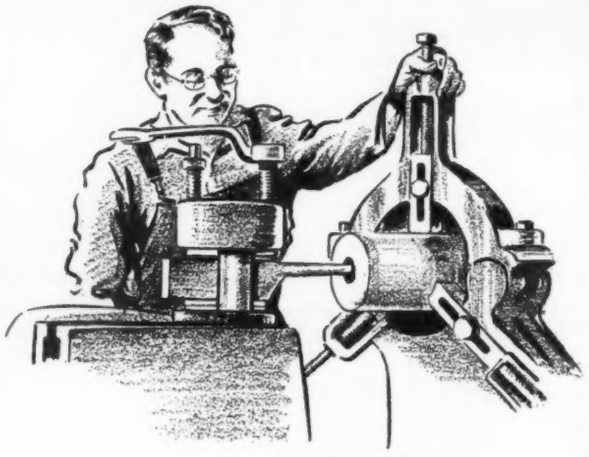
MILLING MACHINES
#1 Kempsmith Universal
#2 Kempsmith Universal
#2 Pratt & Whitney
#5 Hendy Production
Index Vertical Mill
Ingersoll Slab Mill
Ohio Universal
Rockford Bench Mill

SHAPERS
20" Gould & Eberhardt
20" Stockbridge
20" Davis
16" Kelly

BRADLEY MACHINERY COMPANY

211 JOSEPH CAMPAU ST. **DETROIT, MICHIGAN**

FITZROY 6375-6-7



Old 262 is back again

running better than ever

In every shop there is a pet machine. Usually one of the older, trusted hands treats it with loving care, and brags that he knows every turn of its lead screw. Sometimes it is a grinder, a shaper, or even a planer. To take on the job of rebuilding a "pet" is a man-sized undertaking. To do it well is an accomplishment.

In our rebuilding plant we treat every machine as a pet. No single detail in our rebuilding process is neglected on any machine sent to us.

Restoring machine tools to their original standards of precision is our big job and we do it thoroughly and completely on every order, whether it calls for a single lathe or a complete production line.

In several instances we have been told of reduced production costs made possible by our rebuilt machines. Can we help you lower your "cost per unit"?

Your inquiry will be answered promptly.

MACHINES IMMEDIATELY AVAILABLE

2—3"x36" Jones & Lamson Flat Turret Lathes, arranged for Bar Work.
No. 3 Brown & Sharpe Universal Grinder.
No. 2 Brown & Sharpe Vertical Milling Machine.
6"x48" Pratt & Whitney Thread Milling Machine.
10—No. 6 Whitney Hand Millers.
2—Type "B" Briggs Millers.
38"x20' New Haven Lathe.
36"x8" Brown & Sharpe Gear Cutter.
No. 3 Barber-Coleman Gear Hobber.
2-4-6-Spindle Drill Presses.

Daley & Sibley

Machinery Dealers, Inc.

409 Chapel Street, NEW HAVEN, CONN.

IMMEDIATE SHIPMENT

OVERHEAD ELECTRIC TRAVELING CRANES

(3)—6-ton Cleveland	24' 2" to 34' 3"	span, 230-VDC.
(1)—5-ton Shaw Box	63' 0"	span, 220-VAC.
(1)—7½-ton Milwaukee	22' 0"	span, 220 or 550-VAC
(2)—10 & 15 ton Niles	35' 0"	span, 230-VDC.
(1)—10-ton Shaw	75' 0"	span, 220-VAC.
(1)—(15-ton Northern 1-10 & 1-5-ton trolleys)	71' 5½"	span, 220/440-VAC.
(1)—15-ton Niles	48' 0"	span, 230-VDC.
(1)—15-ton Morgan	58' 3"	span, 230-VDC.
(1)—15-ton Shaw	75' 0"	span, 220-VAC.
(1)—20-ton Niles	60' 0"	span, 230-VDC.
(1)—20-ton P&H	66' 0"	span, 230-VDC.
(1)—30-ton P&H	60' 0"	span, 230-VAC.
(1)—40-ton Niles	60' 0"	span, 220-VAC.
(1)—70-ton Northern	80' 0"	span, 220-VAC. —(2—35 ton trolleys)

(2)—3-ton P&H, 40' 0" span, 230-VDC. Transfer Cranes.

ELECTRIC HOISTS

10—1 t. 6-ton P&H, Shepard, 1 & 2 motors, 230-VDC. (floor or cage operated)

BUCKETS

(2)—¾ yd. Hayward Electric A.C. & D.C.
(2)—1 yd. Blaw Knox, single line.
(1)—2½ yd. Blaw Knox, two line.

CRANE & MILL MOTORS

(30)—Westghse K 1 to 10 (incl.) 2 to 60 HP. 230-VDC
(40)—G.E. C.O. 1803 to 1812, 3 to 65 HP., 230-VDC.
(25)—G.E. Type MD 101 to 106, 230-VDC.
(1)—Westghse MCB-100 compound wound, 230-VDC.

Large Stock of D.C. & A.C. Controllers & Electric Brakes

All of the Above in Stock—Immediate Shipment

Send for Our Stock List

T. B. MAC CABE CO.

BELFIELD AVE. WEST OF WISTER ST.
(Magnolia St. & Armstrong Lane) PHILADELPHIA, PA.

Hard-to-find Tools:

USED, IMMEDIATE DELIVERY:

1—#5 **FOSTER TURRET LATHE**—cone drive, barfeed, power feed to turret, hand feed to cross slide—capacity 1½".

2—24" **STEINLE TURRET LATHES**, s.p.d., chucking power feed to turret and to cross slide—hole thru spindle 6¼".

1—#1 **KEARNEY & TRECKER (MILWAUKEE) PLAIN MILLER**—s.p.d.—working surface of table 37⅛"x9½".

1—#1½B special **KEARNEY & TRECKER (MILWAUKEE) PLAIN MILLER** motor drive thru 220/60/3 ph. motor—double overarm, all power feeds all geared feeds and speeds, working surface of table 45½"x11½".

1—#4 **CINCINNATI HIGH POWER PLAIN MILLER**, cone drive, double back geared, all power feeds, all geared feeds, high base—big pulley—working surface of table 64⅛"x16½".

1—#1 **OHIO UNIVERSAL MILLER**, motor drive 220/60/3 ph. all geared feeds and speeds, all power feeds in longitudinal and cross direction. Vertical adjustment of knee by hand, working surface of table 39¼"x8½".

1—#1½ **BROWN & SHARPE UNIVERSAL MILLER**, cone drive—back geared power feeds in longitudinal and cross direction. All geared feeds with universal spiral dividing head, universal milling attachment, etc., working surface of table 33"x7".

1—#6 **DEFIANCE HORIZONTAL BORING MILL**, s.p.d., all geared feeds and speeds, dia. of bar, 4½", table surface, 36"x64".

1—32"x22"x10' **INGERSOLL FIXED RAIL TYPE PLANE MILLER**, motor drive thru gear box—with two horizontal adjustable side heads and with one vertical head.

1—#12 **PRATT & WHITNEY** two spindle **PROFILER**—with geared spindles. Working surface of table 15½"x12".

1—#2 **GARVIN** two spindle Profilers, cone drive, belted spindles.

1—#14 **BROWN & SHARPE PLAIN CYLINDRICAL GRINDER**, VERY MODERN TOOL. Maximum grinding dia. 10", maximum grinding length 18".

1—10"x36" **LANDIS PLAIN CYLINDRICAL SELF CONTAINED GRINDER**. REBUILT.

1—12"x36" **CINCINNATI UNIVERSAL CYLINDRICAL GRINDER**. VERY MODERN TOOL **WITH THREE MOTOR DRIVE.** All power feeds.

1—16"x72" **CINCINNATI UNIVERSAL CYLINDRICAL GRINDER**. VERY MODERN TOOL. **WITH THREE MOTOR DRIVE.** All power feeds.

1—#22 **HEALD ROTARY SURFACE GRINDER**, s.p.d. (fast and loose pulleys) with extra large magnetic chuck of 16" dia.

1—#3 **THIEL FILING AND SAWING MACHINES**—motor drive with built-in motor, 220/60/3 ph.

We carry ONLY GOOD tools in stock!

LAURENS BROS.

Peoples Bank Bldg. **Cincinnati, O.**

Parkway 3315

HELP SPEED OUR DEFENSE PROGRAM

This space is to point out the urgency for "additional equipment for redistribution." What have you to offer?

What You Can Do

Put your idle machines to work. We have many emergency calls for all types of machine tools. You can help the National Defense Program and serve the public interest by offering that unused tool. Make the SUN MACHINERY COMPANY your clearing house for the disposal of those tools and for the purchase of needed machines. Write or wire at once.

SUN MACHINERY COMPANY INC.
36 VAN VECHTEN ST. NEWARK, N. J.

MACHINE TOOLS IN STOCK, IMMEDIATE DELIVERY

DRILLS
2, 3, 4 Spindle, Leland Gifford
No. 3 Avey
25" Snyder Drill
26" Barnes Sliding head
No. 11, 12 P&W Multiple
No. 11, 12, 13 Natco
No. 17 Footburt, 4 Spindle Drill
3½' Western Radial

GRINDERS
14"x36 Norton Multipurpose Universal Hydraulic
20"x96" Landis Universal
Ingersoll Cutter, Grinder

PLANERS
24"x24"x6' Whitcomb
26"x26"x8' Powell, 2 Hds.
38"x38"x9' Flather, 2 Hds.

BORING MILLS
72" Bickford, 2 Hds.
72" Bullard Vertical, 2 Hds.
86" Bullard Vertical, 2 Hds.
37" Baush Vertical, 2 Hds.
4" Bar Beaman & Smith, Fl. Type

MILLERS
No. 5 Cinc. Hi Power Rap. Trav.
No. 4 Cincinnati Cone
No. 2 Milwaukee, Cone
(2) Wisconsin Hand Millers
No. 1½ Knight Vertical
2" Double Pratt & Whitney spline
18" Cincinnati Automatic

LATHES
14"x6' South Bend
16"x6' Cisco
14"x6' American Gd. Hd.
14"x8' Springfield Gd. Hd.
16"x6' Rockford Mfg.
18"x9' Chard
18"x10' Mueller
18"x12' Whitcomb Gd. Hd.
24"x14' New Haven
36" Bridgeford Gd. Hd.
32-64"x11' Faye & Scott Sliding Bed Gap.

PRESSES
3—No. 2 Waterbury Farrell, M.D.
8—No. 31 Waterbury Farrell, M.D.
No. 1½ Bliss Cam Action
No. 4N Bliss, M.D.
No. 178 Toledo Toggle Drawing

TURRET LATHES
1"x15" Pratt & Whitney
1½" Pratt & Whitney Bar Feed
2¼x24 Jones & Lamson
10"—2 Spindle J&L (Steel Hd.)
No. 5A Potter & Johnston
No. 10 Bardons & Oliver
24" Steinle, 6¼" Hole
26" Libby, 7½" Hole

MISCELLANEOUS
1½" Acme Bolt Cutter
2" Greenfield Bolt Cutter
No. 27 Beliot Alligator Shear—10" Blade
500 lb. Bradley Helve Hammer
No. 13 Brown & Sharpe Gear Cutter
No. 3—26" B&S Gear Cutter
No. 4—48" B&S Gear Cutter
9"x9" Peerless Shaping Saw
No. 4 Hilles & Jones Punch & Shear
6" Campbell nibbler
3/16" Libert nibbler, 36" throat, M.D.
2" double Pratt & Whitney Spline Miller
36B—Gould & Eberhardt Gear Cutter
No. 12—2 Spindle Pratt & Whitney Profiler
8" Standard Pipe Machine

WIGGLESWORTH MACHINERY COMPANY
203 BENT ST., CAMBRIDGE, MASS. Cable: WIGMACHINE

OVER 30 YEARS EXPERIENCE IN REBUILDING MACHINERY

VERTICAL BORING MILLS

34" Rogers, turret head on cross rail
36" Bullard Rapid Production
36" Colburn, turret head on cross rail, M.D.
54" Niles Bement Pond, two swivel heads on cross rail, DC, MD.

RADIAL DRILLS

3' Mueller Round Column, gear box
4' Bickford Universal

GRINDERS

16"x18" Landis Plain
2—6"x20" Type "A" Plain Hydraulic, MD.
12"x18" Cincinnati Plain, MD.
16"x48" Landis Crank
16"x50" Norton Type "A" Plain
#50 Heald Cylinder, MD.
#55, #60 and #65 Heald Cylinder
#2 Landis Universal, three MD.
#1 Brown & Sharpe Universal
#2 Taft Pierce Universal
8" Arter Rotary Surface
14" Pratt & Whitney Vertical Surface
2—6"x10"x36" Norton Type "S" Surface, MD.
6"x10"x36" Norton Hydraulic Surface, MD.
24"x96" Landis Roll

LATHES

14"x6' American Geared Head, SPD
14"x8' Monarch
16"x8' LeBlond, taper attachment
18"x8' Cisco, Taper attachment
18"x8' Pratt & Whitney
24"x10' Lodge & Shipley
20"x12' Lodge & Shipley, taper attachment
42"x12' Pittsburgh
20"x14' Lodge & Shipley
26"x48"x20' McCabe Two-in-One

MILLERS

Several 16" and 22" Briggs Type "A"
Several 42" and 72" Briggs Type "B"
#10 Bilton Productomatic
12" Pratt & Whitney Auto.
16"x14" Pratt & Whitney Thread
6"x48" Pratt & Whitney Thread
6"x80" Pratt & Whitney Thread
Several #0Y Brown & Sharpe Plain
#1H Milwaukee Plain, MD.
#2Y Brown & Sharpe Plain
#2 Kempsmith Plain
#2 Taylor & Fenn Vertical
#2 Brown & Sharpe Vertical
Several—#CS Becker Continuous Verticals
#AB Becker Vertical
#5B Becker Vertical
#6 Becker Vertical
#1 Kempsmith Universal
#2B Hendey Norton Universal

SCREW MACHINES

#00 Brown & Sharpe Full Auto.
Several—#00 Brown & Sharpe Turret Formers
#0 Brown & Sharpe Full Auto.
Several—#0 Brown & Sharpe Turret Formers
#2 Brown & Sharpe Cut-off
#4 Brown & Sharpe Auto.
⅞" Cleveland Model "M", MD.
5½" Cleveland Model "A"
⅞ Gridley Model "F"
9/16" Gridley Model "G"
1¼" Gridley Model "C"
10—#52 National Acme
9—#53 National Acme
#55 National Acme
6"x6-¾" Goss DeLeeuw Auto. Chucking, MD.

J. L. LUCAS & SON, INC.

1 Fox Street — **Bridgeport, Conn.**

PRESSES

FOR SHELL MANUFACTURERS AND METAL STAMPERS

2—BLISS NO. 27-K, 1000 TON KNUCKLE JOINT COINING
2—BLISS NO. 77½ STRAIGHT SIDED, GEARED
5—WATERBURY-FARREL 30 TON RACK & PINION, 48" STROKE
5—WATERBURY-FARREL GEARED TAPERING PRESSES
FERRACUTE CLASS "D" SERIES "D" HORIZONTAL SCREW REDRAWING PRESS
BLISS 60 TON GEARED TAPERING PRESS
WATERBURY-FARREL 125 TON—36" STROKE VERTICAL HYD.
WATERBURY-FARREL 157 TON—56" STROKE VERTICAL HYD.
WATERBURY-FARREL 241 AND 304 TON—10' STROKE HORIZ. HYDRAULIC
WATERBURY-FARREL 3000 TON HYDRAULIC HEADING PRESS
WATERBURY-FARREL 20 TON HIGH SPEED RACK & PINION
BLISS NO. 60—15 TON RACK & PINION REDUCING
BLISS No. 74½, NO. 204, NO. 304 STRAIGHT SIDED
STOLL NO. 67 STRAIGHT SIDED
STANDARD NO. 4R, 10" STROKE, GD. REDUCING STRAIGHT SIDED
BLISS NO. 1, NO. 1½ GEARED DOUBLE ACTION TOGGLE
WATERBURY-FARREL NO. 5, NO. 6 DOUBLE ACTION CAM TOGGLE
BLISS NO. 16—4" STROKE OVERHANGING OPEN BACK TRIMMING
*WATERBURY-FARREL SIX PLUNGER FOR CARTRIDGE CLIPS *(Send for Photo)
STEAM HAMMERS—CHAMBERSBURG 1500 LB. DROP
BOARD DROP HAMMER—CHAMBERSBURG 800 LB.; B&S 1400 LB.

Hundreds of Machine Tools in Stock

BOTWINIK BROS. INC.
NEW HAVEN, CONN.

1—⅝ x 7 Six spindle **New Britain Automatic**
2—¼ Four spindle **Gridley,** Model F. M.D.
5 AC **Lees Bradner Gear Hobber.** M.D.
2—3 and 4 spindle **Sipp Highspeed Drill Presses**
2 spindle **Edlund Highspeed Drill**
1 spindle **Edlund** equipped with tapping attachment
24" **Cincinnati Face Mill Grinder.** M.D.
70A **Heald Internal Grinder.** M.D. 3 AC Motor. Delivery 8 weeks.
24" **Cincinnati Duplex Mill.** S.P.D. Special heads
20 x 8 **Boye & Emmes Lathe.** Belted M.D.
18 x 8 **American Lathe.** 3 step cone
15 x 8 **Carroll Jamieson Lathe.** 3 step cone
16 x 6 **American Lathe.** 3 step cone. T.A.
#4 **Warner & Swasey Turret Lathe.** Cond. Drive.
#1 and #2 **Brown & Sharpe Universal Grinders.** Belt drive.
#22 **Heald Rotary Grinder.** 12" Chuck. M.D.
Natco multiple Drills. All sizes.
#4B **Cochrane & Bly Cold Saw.**
2 spindle **Landis Nipple.** 2" capacity. M.D.
#3 **Manville Thread Roller.** Hand Feed.
#3 **Canton Alligator Shear.** M.D. 16" Blade.

INTERNATIONAL MACHINERY CO.
3131 E. JEFFERSON AVE.
DETROIT, MICHIGAN

If You Don't See What You Want —*ask for it!*

Quoting the storekeepers old slogan: "If you don't see what you want—ask for it." Ask the advertisers. They are constantly adding to their stocks and may have acquired just what you need. Or, shall we ask them for you? Write the

Departmental Staff

American Machinist
330 W. 42nd St., New York, N. Y.

"DEPEND ON DELTA"

AIR COMPRESSORS
368 CFM Ingersoll Rand ER-1
366 CFM Penna. Class 3A
210 CFM Chicago Pneu. P2-DGL
188 CFM Penna. Class 3A
173 CFM Ingersoll Rand ER-1
153 CFM Ingersoll Rand ER-1
149 CFM 250 lb. Penna.
145 CFM Gardner
64 CFM Ingersoll Rand ER-1

TURBO COMPRESSORS
650 CFM 18 oz. Spencer
125 CFM 16 oz. Spencer

BOILERS, ASME
250 H.P. Brownell Self Cont. with Stoker
210 H.P. Standwood, Self Cont.
20 H.P. O. & S. Scotch Marine

CRANES
5 Ton Euclid 2 Motor A.C.
3 Ton Euclid 3 Motor A.C.
1½ Ton Euclid 3 Motor A.C.
1 Ton Shepard I.B. Girder

LATHES
27" x 14' Lodge & Shipley
24" x 12' Lodge & Shipley
24" x 12' Boye & Emmes
20" x 10' Schumacher, Boye & Emmes
18" x 8' Rahn Larmon
16" x 8' American

GRINDERS
Diamond Surface, Cap. 24" x 12" x 12"
No. 10 Besly Disc
Grand Rapids Drill
No. 6 Bryant Chucking

SHAPERS
20" Ohio
24" Cincinnati

MACHINE TOOLS, ELECTRIC WELDERS, PUMPS and ELECTRIC MOTORS

McBRIDE & McCLENNEN—Since 1919
Trading as
DELTA EQUIPMENT CO.
148 N. Third St., Philadelphia, Pa.

IF TOOL SHORTAGES ARE CAUSING PRODUCTION LOSSES . . . SEE MARR-GALBREATH

American Compressor, 676 CFM. Syn. M.D.
American Compressor, 176 CFM. Ing.-Rand., belted.
Bolt Threader, 1" Greenfield, M.D.
Boring Mill, Vert. 30" King, Turret Hd.
Brakes, Apron, 10'x10 ga., 8'x12 ga. Chgo.
Corrugating & Crimping, 10'x16 ga. Keene.
Drills, Hvy Duty, 20" F-B; 24" Rockford.
Filing Mach., #2 Cochran-Bly.
Grinder, Plain, #11 B&S., motor dr.
Grinder, Disc, 53" Gardner, Vert. shaft.
Grinder, Surface, #2 W.&M., B.D.
Hack Saws, 6x6" Peerless; #5 Marvel.
Hammer, 75 lb. Beaudry, Power.
Hammer, Board Drop, 400 lb. Bliss.
Hammer, Steam Drop, 1100 lb. Chbg.
Lathe, 14"x6' Monarch, Q.C.G., M.D.
Lathe, 36"x20' Springfield, Hvy, 230 V. DC. motor.
Lathe, Turret, 21" Gisholt, 3½" hole, M.D.
Lathe, Turret, 24" P.&J., 3" hole, cone.
Miller, Vert. #2 Becker, Rotary table, M.D.
Miller, Plain, #3½ Fox, belted.
Miller, Hand, #3 Rockford.
Pipe Machs. 8" Jarecki; 18" Standard.
Pipe & Nipple Mach., 2" Landis, Dbl. Head.
Press, Punch type, #94 Consolidated Plain, MD.
Press, #59¼ Toledo SS. SC., TR., FC., 80,000#.
Punch, SE., Cleveland EF. 36" tht., 1¼x1½.
Punch & Shear, S.E., #7 L&A., 5" tht., cap. ⅝"x⅝".
Saws, Cold, #1 Newton, cap. 8", SPD.
Saws, Cold, 24" blade, Espen-Lucas, SPD.
Saws, Friction, #0 Ryerson, 10 HP. 3/60/440 V.
Shear, Plate 60"x¼", L&A., #3 5" gap, SPD.
Shaper, 16" Smith & Mills, M.D.
Shear, Bar, #3 United, cap. 2½" sq., M.D.

MARR-GALBREATH MACHINERY CO.
58 WATER ST. PITTSBURGH, PA.

READY FOR DELIVERY

72" Gould & Eberhardt Gear Cutter
No. D2 Colburn Heavy Duty Drill, M. D.
3 Baker Heavy Duty Drills, Style F
36" Cincinnati Sliding Head Drill, Tapping Attachment
28" Cincinnati Sliding Head Drill, Tapping Attachment
No. 2 Thompson Universal Grinder
No. 3 Cincinnati Universal Grinder
No. 14 Gardner Double End Disc Grinder, M. D.
24"x14' Reed-Prentice Geared Head Lathe
40"x15' Pond Lathe
14"x6' Reed Lathe
No. 3 Davis Thompson Duplex Miller
Parker Bros. Climb Miller
36" Rogers Vertical Turret Machine
42" Rogers Boring Mill
300 Ton Dunning & Boschert Hydraulic Press
No. PG3 Ferracute Press
No. 92 Bliss Punching & Riveting Press
No. 6 Niagara Press
8" Oster Pipe Machine, M. D.
3" Williams Pipe Machine, M. D.
5—20"x20"x48" Whitcomb Planers
No. 4C Cochrane-Bly Cold Saw, M. D.
24" Sellers Slotter, M. D.
Automatic Electric Lift Truck
No. 2 Garvin Tapper
Type B-84 Taylor-Winfield 4 corner Flash Welder

Your Inquiries Appreciated

GANEY MACHINERY COMPANY
131 ARTHUR ST. BUFFALO, N. Y.

OTT MACHINERY SPECIALS

AUTOMATICS:
Cleveland, model A, ⅝, ⅞, 1¼ & 2"
Cleveland, Model C—1¼" Motor Drive
Gridley, Model F, 4 spindle, ¾ & 1⅜"
Gridley, Model G, 1¾" 4 spdle.
National Acme, 3" Model B 4 spindle

DRILLS, Allen H.S. B.B. 2 sp., P.f. No. 2M.t.
Edlund, No. 1A, 4 spdl. P.f. No. 3 M.t.
Defiance No. 112 Production, M.D.
Baush & Natco Multiple spindles
Deep Hole Drillers, P. & W. 6 Sp. Vert.

GEAR CUTTERS, Brown & Sharpe No. 4-48"
Cincinnati No. 4-36"

GEAR HOBBERS, Lees-Bradner No. 5

GRINDERS, Bryant No. 3 Internal, Motor Dr.
Heald Nos. 55, 60, 65, 70, and 75
Landis, 10x20" Hydraulic, 30" Whl., M.D.
Landis, 10x24" plain, self contained
Norton, 16x36" Crankshaft
Cincinnati Face Mill, Excello M.D. spdle.
Wilmarth & M. No. 1 Universal Tool
Hydraulic Vertical Broach, Colonial 36" Str., 54" Daylight, 36"x36" Platen, M.D. like new

LATHES, American 18"x8' Q.C. T.A.
Cisco 14"x8' Q.C.
Hendey, q. c. 16"x8' & 18"x10'
LeBlond, 30"x8' Semi. Q.C.

MILLS, No. 2½ Rockford Plain
No. 4 Cincinnati Plain, Cone
Pratt & W. 6x14" Thread, M.D.

PLANERS, 36"x44"x10' Cincinnati, 2 heads
36"x36"x12' Gray, H.D. 2 heads M.D.

PRESSES, No. 73½ Bliss, S.S., S.C., S.F. 3" stroke
15 & 50 ton Lucas Forging Nos. 54 & 55 Bliss, Solid Back

SHAPERS, 24" Cincinnati & Walcott Cone

SLOTTERS, 3½" Rhodes, M.D. 8" R.T. 5½" Industrial—18" R.T.

TAPPERS, No. 1, 2 & 2X Garvin

OTT MACHINERY SALES, Inc.
542 Second Ave., DETROIT, MICHIGAN

Save Money—Ship by Boat

Buy Good Used Machine Tools

Like those listed below

BORING MILLS
ROCK. No. 2 Horiz. 3½" dia. bar.
COLBURN and BULLARD 42" Vertical
BAUSH 44" M.D. Vertical

RADIAL DRILLS
FOSDICK 2' Arm M.D. Gear Box.
BICKFORD 4' Arm S.P. Gear Box Drive.
MUELLER 4½' Gear Box Drive.

GEAR CUTTERS
G & E 48" & 60" Spur Gear.
B & S No. 3 Spur Gear 26".

GRINDERS
P & W 12" Vert. Auto Surf.
DIAMOND No. 2 Horiz. Auto. Surf.
LANDIS 10"x20" & 10"x30" Plain Cyl.
NORTON 6"x32" and 10"x36" Plain Cyl.

LATHES
MONARCH 14"x6', HENDEY 16"x8', AMER. 22"x8'.
L & S 20"x10', LEHMANN 18"x9', S.B.&E. 31"x12' C Head HENDEY 16"x10' Grd. Hd.

MILLING MACHINES
LeBLOND No. 3-H & No. 4, B&S No. 3 Plain.
CLEVELAND No. 2 Grd. Hd. Pl. CIN. #1½, B & S No. 3.
OHIO No. 3 Univ. INGERSOLL M.D. Slab 4 Hds.

PLANERS
GRAY 48"x48"x10', SELLERS 36"x36"x12'.

PUNCH PRESSES
BLISS No. 407-A D.C. Toggle Drawing Wt. 70,000 Lbs.
FERRACUTE No. EGF-52 Coining 150 Tons.

SHAPERS
CINCINNATI 24" S.P.D. B.G. Crank.
GOULD & EBERHARDT 24" S.P. Gear Box Drive B.G. Crank.
OHIO 26" Hvy. B.G. Crank.

SCREW MACHINES
GRIDLEY 4-Sp. Model "F" 2¼" Cap.

SQUARE SHEAR
NIAGARA 10' 14-Ga. Cap. M.D.

TURRET LATHES
BULLARD 24" S.P.D. Vertical.
BAUSH 30" M.D. Vertical.
W & S No. 8 C.D. 3½" hole.
P & J No. 10 hole 5¾".

Let Us Quote On All Machinery Needs

McDONALD MACHINERY CO.
1531-35 N. Broadway St. Louis, Mo.

High Grade
MACHINE TOOLS

ENGINE LATHES
TURRET LATHES
MILLERS
GRINDERS
RADIAL DRILLS
GEAR CUTTERS
GEAR HOBBERS
GEAR GENERATORS
PLANERS

Other types of machine tools

INDIANAPOLIS MACHINERY & SUPPLY CO., INC.
1959-69 South Meridian Street
INDIANAPOLIS, INDIANA

AUTOMATICS
1" Cleveland Model J dble and threading
1"x5" New Britain 6 spindle.
1¼" Gridley 4 spindle Model G.
1½" Cone 4-spindle.
1½" Cleveland Model M, 4-spindle.
1⅝" No. 55 National Acme
1⅝" New Britain, 6-spindle.
1⅝" Gridley 4-spindle, Model F.
2" National Acme, 4-spindle, Model B.
2¼" No. 56 National Acme, 4-spindle.
2⅝" Gridley 4-spindle, Model F.
3¼" Gridley single spindle.
4¼" Gridley single spindle.
No. 24 New Britain chucking.
No. 33 New Britain chucking.
18" Gisholt Simplimatic.

PLANERS
24"x24"x24" Cincinnati crank type.
24"x24"x8' Rockford. 1 rail head.
32"x32"x12' Niles. 1 rail, 1 side head.
36"x36"x10' Detrick & Harvey open side.
36"x36"x16' Cleveland open side.

PRESSES
No. 5-1 Cleveland Obi, 2½" stroke.
No. 6 Toledo OBI, 2¾" stroke.
No. 10-1 Cleveland OBI, 4" stroke, 14,000 pounds.
71 ton Waterbury Farrel Obi. 4" stroke.
No. 65 Bliss Consolidated, geared.
No. 7 Rockford straight side.
No. 8-7 Zeh & Hahnemann straight side.
No. 55 Toledo double geared, 10" stroke.
No. 55½ Toledo straight side.
No. 55½—56 Toledo straight side, geared.
No. 74½ Bliss straight side.
No. 4 Massillon straight side, geared.

MILES MACHINERY CO.
Saginaw, Mich.

DRILLING MACHINES

10—2-spdle. Allen Hand Feed, H.S., #2 taper
3—3-spdle. Allen Hand Feed, H.S., #2 taper
2—3-spdle. Allen Power Feed, H.S., #2 taper
4—4-spdle. Allen Hand Feed, H.S., #2 taper
3—4-spdle. 20" Cincinnati Gang
1—#3 Avey 2-spdle. Horiz., m.d.
1—C-12 NATCO Multiple, 12x12 hd.
1—#13 NATCO 14-20 hd.
2—C-13-H NATCO Hydraulics, spec. hds.
2—#14 NATCO Multiple, rect. hd.
1—#40 NATCO Straight Line
1—#60 NATCO 3-way
1—14" Bausch rd. hd.
1—7-spdle. # 2 Foote-Burt Gang.

THE STRONG, CARLISLE & HAMMOND CO.
1392 West 3d St. Cleveland, Ohio
2832 E. Grand Blvd. Detroit, Mich.

Practically New Washing Machines
2—Blakeslee #50-P Alkali Washers
1—Blakeslee #80-P Alkali Washer
1—Ransohoff Ideal Washer
Conveyor and Monorail Types

D. E. DONY MACHINERY CO.
47 LAURELTON ROAD
ROCHESTER, N. Y.

---

4 & 6 Spindle Avery Sensitive Drills, No. 2 M.T., B.B.

No. 1B, No. 2B Edlund, 2 Spindle Sensitive Drills

Landis Plain Grinders 12"x42", 12"x52", self contained countershaft, motor drive

Landis Crankshaft Grinders 16"x48", self contained countershaft, motor drive

20"x10' Monarch Lathe, T.A. Q.C.G. Cone

18"x8' Monarch Lathe Q.C.G. Cone

No. 3 L & A Shear, ¼"x52" cap.

No. 11, 12, 13 Natco Drills

Allis-Chalmers Rotary Compressor, 238 cu. ft. Direct M.D. as good as new

IROQUOIS MACHINERY CO.
662 Ohio St. Buffalo, N. Y.

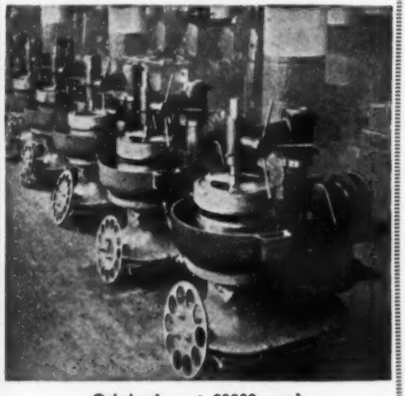
GOOD MACHINES

18 x 6 Geared Hd. Motor Driven Kimbal Lathe
19" x 10' LeBlond Q.C. Lathe with extra P.F. Turret
#5 Michigan Incl Punch Press
#4 Niagara Incl Punch Press
#19½ Holden Incl Punch Press
#P-2 Ferracute Punch Press
#3 R & K Horning Press
#3 Bausch 38 Spdl Drill Press
60 KVA Gibbs Apot Welder Air Op.
30 x 30 x 7' D & H Openside Planer
#7⅛ Gardner BB Motor Dr Disc Grinder
20" Columbia Shaper, M.D.
24" Cincinnati Shapers
6 Spindle Holmes Nut Tapper

THE TOLEDO MACHINERY EXCHANGE CO.
5 N. St. Clair St. Toledo, Ohio

1-F NORTON LAPPERS

From the former Grigsby-Grunow Co.



Original cost $2200 each
IMMEDIATE DELIVERY

Every machine in practically new condition, complete with 3 H.P. A. C. motor. Diam. of laps, 20".

LOUIS E. EMERMAN & CO.
1761 Elston Ave. Chicago

1—16A Blanchard Surface Grinder, Serial #1264.
1—#6 Becker Vertical Mill with Rotary Table.
1—#2 Cincinnati Plain Mill.
1—#3 Cincinnati Plain Mill.
1—14x7 LeBlond Rapid Production Lathe, with turret.
1—20" Potter & Johnston Shaper, M.D.
1—#6 Whitney Hand Mill.
1—#14 Brown & Sharpe Plain Grinder, c/s.
1—Pratt & Whitney Duplex Mill.
1—#4B Cochran & Bly Cold Saw with motor.
1—#12 Barber Colman Gear Hobber, single overarm.

Your inquiries receive prompt attention

CENTRAL MACHINE TOOL CORPORATION
122-126 Nebraska Ave. Toledo, Ohio
Adams 1914

Buying
Good Used Equipment

is frequently the difference between having needed equipment or doing without it.

A FEW HIGH GRADE MACHINES FROM STOCK

MILLING MACHINES
No. 1½-B Milwaukee Universal, dbl. overarm, comp. m.d.
No. 1-A Milwaukee Plain, single overarm, s.p.d.
No. 29 Ohio Universal, complete, m.d.
No. 3 Cincinnati Plain, rectangular overarm, m.d. (2)

THREAD MILLER
No. 3-C Lees Bradner, motor drive

LATHES
32"x12' H.S. & G. Q.C.G., belt drive
48"x10½' Bradford, standard change gear, belt drive
26"/48"x18' McCabe two-in-one, standard change gear

SCREW MACHINES
2¼" Gridley Single Spindle Automatic, m.d.
3¼" Gridley Single Spindle Automatic, m.d.

TURRET LATHES
No. 3 Foster, p.f. cross slide and turret, m.d.
No. 9 Foster, p.f. cross slide and turret, m.d.

PLANER
88"x55"x18' Rockford, m.d. 2 hds. on rail, 1 side head

COMPLETE NEW 1941 STOCK LIST ON REQUEST

DAVIS MACHINERY CO.
Toledo Ohio

QUICK DELIVERY

AIR COMPRESSORS

888' I.R. X-B-10, belted m.d.
528' 14 x 12 ER-1 Ing.-Rand
511' 15x9x10 Chi. Pneu. 0-CB

BOLT CUTTERS

5" Acme, cone drive
3" Landis, geared mtr. dr.
2" Acme, cone drive
2" Landis, geared mtr. dr.

BORING MACHINES

10' Betts Vertical, mtr. dr.
90"-12' Betts Vertical
52" King Vertical
8" bar Barrett Cyl. Borer, 25' bar
7" bar Barrett Cyl. Borer, 20' bar
No. 3—6" bar Barrett Horiz. Cyl.
4" bar Binsee Horiz., knee type

CRANES

15 ton 40' span Niles OET
5 ton 28' 1½" span Roeper

DRILLS

8' Sellers Radial, mtr. dr.
6' Mueller Semi-Univ. Radial
3' American Radial
3' Fosdick Plain Radial, s.p. gear box dr.

GRINDERS

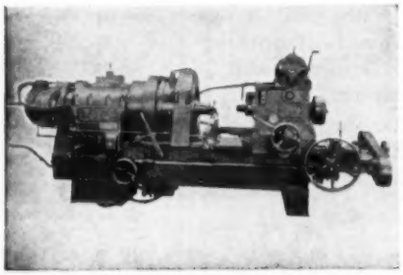
No. 3—30"x19'6" Lobdell Roll Gr., crown. att.
12"x48" Modern Plain Grinder, belt
10"x36" Landis Plain Self-Cont.
7⅛"x16" Sichel Hob Grinder
No. 2 Sellers Drill Grinder
Sellers Drill Point Thinner

LATHES

62" x 29' Niles, triple geared
48" x 22' Niles, triple geared
36" x 28' Niles, triple geared
36" x 17' New Haven Eng., cone dr.
32" x 20' New Haven Eng., cone dr.
32" x 12' LeBlond, q.c.g., turret on bed
24" Standard Roll Turning, dbl. piano rest, cap. 30" dia., 18' centers
30" x 16' Niles, cone drive
30" x 12' Gleason, dbl. back geared
28" x 20' Niles, cone drive
28" x 10'6" Schu. Boye, d.b.g., q.c.g., t. att.
26" x 14' Bridgeford Plain Turning
24" x 15' Niles, cone drive
24" x 12'6" Schumaker Boye, d.b.g.
24" x 10' Schumaker Boye, q.c.g.
22" x 12' Niles, cone drive
22" x 10' Niles, cone drive
20" x 8' Prentice, geared head
18" x 10' L. & Ship., q.c.g., cone
18" x 10' LeBlond, q.c.g.
18" x 9' Lodge & Davis, cone drive
16" x 6' LeBlond, q.c.g.
28" Gosholt Turret Lathe, cone dr.
24" Gisholt, 6¼" spindle, cone dr.
24" Steinle Tur., 6¼" spindle
No. 2A Warner & S. Universal Turret
No. 3—14" W. & S. Fox Lathe, cone
2—American Fox Lathes, cone
2—Bardons & O. Auto. Facing
2—No. 6-A Potter & J. Auto.
11—3¼" Grid. Sql. Spdl. Auto.
13—2¼" Grid. Sql. Spdl. Auto.
2—1¾" Four-Spdl. Gridleys
⅛-⅞" Cleveland Model A

MILLING MACHINES

No. 4 Cincinnati Plain Miller, cone dr.
No. 3½ Pratt & W. Dble. Spdl.
No. 2M Potter & J. Mfg., s.p.d.
Whitney Geared Hand Miller
11" x 24' Milled Screw Co. Thd.
2—No. 23 Smalley Gen. Thd. Millers, 6" spdl.



NO. 27 SMALLEY GEN. THD. MILLER, 18" pot chuck, 39" deep, 10" hollow spindle

HAMMERS

300-ton United Eng. Steam Forging
1400 lb. Sellers Steam Forging
600 lb. N.B.P. Single Frame Forging
300 lb. Sellers Steam Forging

PLANERS

56"x56"x18' Cincinnati Planer, 2 heads
54"x54"x15' Sellers, 3 heads
48"x48"x16' D. & H. Openside, box table, 3 heads
36"x36"x10' Gray Planer, belt drive
32"x32"x8' Gray Planer, belt drive

PLATE PLANERS

22' No. 2 Hilles & Jones
22' Southwark Plate Planer

PUNCHES & SHEARS

Camden Dbl. End, stl. fr., 45" th.
Pels, RLUmS No. 26, 24" thr., cap. 1⅜" thru 1", arch. jaw
No. 6 Hilles & J. Punch, 62" thrt.

ROLLS

10'x⅜" Teal Pyr. Roll, drop end
16"x24" Bliss Revers. 2-Hi Cold Strip Mill, 350 HP 440 V. AC mtr.
10"x12" Bliss 2-Hi Cold Strip Mill, m.d.

MISCELLANEOUS

No. 3 Mitts & Merrill Keyseater
42"-#510 Newton Cold Saw, mtr. dr.
20" Cincinnati Back Geared Shaper
72" Newton Slotter or Vert. Plan. Mch., m.d.
18" Bement Crank Slotter, mtr. dr.
12" Hewes & Phillips Slotter
9" Sellers Slotter
6000 lb. Auto. Trans. 72" Tier Lift Truck
6000 lb. Lakewood Eng. 60" Tier Lift Truck
2—6000 lb. Baker 60" Tier Lift Trucks

MACHINE TOOLS SALES COMPANY
501-517 No. 17th St. **Philadelphia, Pa.**
Cable Address: MACHTOOL, Philadelphia

ReMANUFACTURED MACHINE TOOLS
-(ORIGINATED BY US)-

Reg. U. S. Patent Office

Motor Drive Norton Grinders

6"x18"	10"x50"	16"x50"
6"x32"	10"x72"	16"x72"
10"x18"	10"—15" GAPx72"	16"x120"
10"—15" GAPx18"	14"x36"	18"x96"
10"x24"	14"x50"	18"—24" GAPx96"
10"—15" GAPx24"	14"x72"	21"x96"
10"x36"	14"x96"	24"x120"

See our advertisement page 368 this issue

Boring Machines
No. 2—5" Bar Barrett, Extension Bed

Boring Mills
42" Gisholt
42" Bullard, 2 Rail Heads
52" Gisholt
54" Colburn
60" Gisholt, motor drive
72" King, motor drive
72" Bickford
76" Bullard

Drills
1, 2, 4 spdl. Henry & Wright
No. 2—4 & 6 spdl. Leland-Gifford
No. 2 Colburn, 3 & 4 spdl.
No. 4—5 Spdl. Foote-Burt Rail
No. 1, No. 3 Baush Multiple
No. 4 Baush Multiple, 16 spindles

Radials
3' Western, Plain
4' American Plain
4' Western, Motor on Column
6' American Plain
6' Fosdick Plain
6' Western Plain
6' Reed-Prentice, Motor Drive
7', 8' Western Heavy

Gear Cutters
Nos. 2, 3, 12 Barber-Colman
No. 3—26" Brown & Sharpe
No. 4—48" Brown & Sharpe
No. 6—72" Brown & Sharpe
No. 6-A 72" Cincinnati
Nos. ½, 1, 2 Pfauter
No. 16—HS G. & E. Hobber
No. 24—HS G. & E. Hobber
18" Gleason Bevel Generator

Grinders
10" swing Norton Universal
14" swing Norton Universal
No. 2½ Universal (Bath Type)
10"x36" Thompson Universal
No. 4—12"x68" Landis Universal
14"x96" Norton Face

Lathes
17"x6' LeBlond
18"x8' Lodge & Shipley
18"x12' American Geared Head
20"x8' Rahn-Larmon
20"x10', 12' Lodge & Shipley Grd. Hd.
20"—40"x10' Rahn-Larmon Geared Head Sliding Bed Gap
24"x12' American
24"x16' Lodge & Shipley
24"x18' Lodge & Shipley
24"x18' American Geared Head
24"x20' L. & S. Grd. Hd., Taper
24"x22' Lodge & Shipley, taper attachment
27"x18' American Geared Head, taper Att.
30"x12' Lodge & Shipley
36"x16' American, Taper
36"x24' Bradford Triple Geared, Taper Att.
46"x30' Houston, Stanwood & Gamble Grd. Hd.

Millers
No. 2 Ford-Smith Universal
No. 24 Brown & Sharpe Plain
No. 4 Hendey Mfg.
Type "B" Briggs Mfg.
No. 5 Brown & Sharpe Vertical
No. 5-B, No. 6 Becker Vertical
Model C2 Becker Vertical
24"x24"x12' Ingersoll Adj. Rail
36"x36"x12' Newton Duplex
38"x44"x20' Ingersoll Slab
72"x16"x14' Ingersoll
No. 1 Smalley-General Thread

Planers
24"x24"x6' Cincinnati
24"x24"x12' Gray
30"x30"x8' American
36"x36"x12' American
36"x36"x8', 18' Cincinnati
36"x36"x16' Niles-Bement-Pond
42"x42"x14' Gray
48"x48"x10' Niles-Bement-Pond
60"x48"x20' Hamilton
72"x60"x16' American

Turret Lathes
No. 6—2" Wood, A.C. & B.F.
No. 6—2¼" W. & S., A.C. & B.F.
18" Libby, Motor Drive
No. 3-A W. & S., A.C. & B.F., Taper Att.
3"x36" Pratt & Whitney, A.C. & B.F.
3"x36" Jones & Lamson
2¼"x26" Greenlee, A.C. & B.F.
3½"x40" Greenlee, A.C. & B.F.
21" Gisholt, 3½" H.S.
24" Gisholt, 6¼" H.S.
26" Libby, 7½" H.S., Taper Att.

See our advertisement page 368 this issue

HILL-CLARKE MACHINERY COMPANY
651 Washington Blvd. **Chicago**

IMMEDIATE DELIVERY

LATHES

15—24" Lathes—10 to 20 ft. beds
1—48"x16' New Haven Lathe

PLANERS

1—36x36x12' Woodward Planer
1—36x42x12' Pond Planer
1—30x30x8' Cincinnati Planer

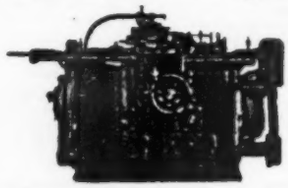
BORING MILL

1—48" Colburn Vertical—P.R.T.

ADELPHIA EQUIPMENT CO.
341 No. 3rd St.
PHILADELPHIA, PA.

ARTER No. 132 Automatic Grinders

For automatic grinding between centers, particularly where two or more diameters must be ground concentric—the outside diameter concentric with the bore—or square with the end face.



PRACTICALLY NEW

Complete with WORK TURRET, A.C. motor and electrical equipment.
IMMEDIATE DELIVERY FROM STOCK

LOUIS E. EMERMAN & CO.
1761 Elston Avenue — Chicago, Illinois

IN PHILADELPHIA STOCK

Inclinable Presses, 5 to 75 ton
Straight Side Presses, 25 to 100 ton, strokes up to 10"
Double Crank Presses, 30 to 44"
Arch Presses, 30 to 60 ton, strokes up to 7"
Back Wheel Presses, 15 to 35 ton
Spot Welders, 5 to 200 KW
10 ft. 10 ga. Power Squaring Shears
(2) 18" & 8' Sidney Quick Change Gear Lathe
14 x 8' Sidney Quick Change Gear Lathe with collets

FRANK J. LUNNEY
Metal Working Machinery
2860 N. 17th St. Philadelphia, Pa.

IMMEDIATE DELIVERY

2—4" x 18" Foster hydraulic Cylindrical **Superfinishers.**
1—Bergram high production **Surface Grinder,** Type SG-1, Diameter of work table, 38".
1—Rebuilt 15 x 8 Landis, type A, hydraulic **Internal Grinding Machine.**
1—Illinois Tool Works **Gear Charting Machine,** capacity 12" diameter 15" between centers.
2—Natco two-way horizontal **Multiple Drilling and Reaming Machines.**
1—Tinius Olsen vibro-electric static dynamic **Balancing Machine.**

For information and details apply to

E. Hennigson & Co.
8 and 10 Bridge St., New York City

TOGGLE DRAWING PRESSES

(2) No. 3½-A Bliss Toggle drawing
(1) No. 1 Bliss Toggle drawing
(1) No. 1½ Bliss Toggle drawing
(1) No. 1 Bliss Cam drawing

Write for Complete Specifications

J. N. MOYER
463 North Fifth St., Philadelphia, Pa.

No. 6—DEFIANCE horizontal Boring, Milling, Drilling and Tapping machine.

Diameter of spindle 4½ inches, working surface of table 36"x64", single pulley drive.

Immediate deliveries from our Chicago Stock!

THE E. L. ESSLEY MACHINERY CO.
835 W. Evergreen Ave., Chicago, Ill.

TOOL VALUES

Brown & Sharpe No. 4—36" Gear Cutter
D. E. Whiton No. 1—26" Automatic Full Universal Gear Cutter
Barber Colman No. 12 Gear Hobber with single thread worm
Leland and Faulconer No. 2 Wet Tool Grinder
Cincinnati No. 1½ Tool & Cutter Grinder
Cochrane Bly No. 6 Circular Cutting-Off Machine
Newton Vertical Slab Miller
Becker No. 7 Vertical Milling Machine
Cincinnati 24" Semi-Automatic Milling Machine
National Acme 3¼" Single Spindle Gridley Automatic Screw Machine
Landis 1½" Single Head Threading Machine
Lodge & Shipley 16"x6' Simplified 3-Step Cone Head Lathe without thread chasing mechanism.

The LODGE & SHIPLEY MACHINE TOOL CO.
3055 Colerain, Cincinnati, Ohio

QUALITY MACHINE TOOLS

Toledo #164½ Toggle Press.
Ferracute Geared Inclinable Press.
#2 Mitts & Merrill Keyseater.
Langelier Nipple Machine, 5-station.
Bickett Vertical Miller, size O.V.
16" x 6-ft. Cisco Tool Room Lathe.
Binse Horizontal Boring Mill, table 3x5.

THE ELYRIA BELTING & MACHINERY CO.
ELYRIA, OHIO

New—MACHINE TOOLS—Used

WEST PENN MACHINERY CO.
1210 House Bldg. Pittsburgh, Pa.

IMMEDIATE DELIVERY

Rebuilt 18"x50" Motor Driven Plain Grinder—$3500.00.
#6 B & S Automatic Spur Gear Cutter 60"x11"—$3500.00.

BANSBACH MACHINERY CORP.
3845 Madison St. Chicago, Ill.

LATHES

18"x10' Hendy Q.C. 4 Step Tie Bar
18"x8' National Quick Change 3 S. Cone D.B.G.
20"x8' Lodge Shipley Geared Head
20"x10' Sidney Q.C. 3 S. Cone D.B.G.
26"x12' Bridgeford Q.C. 3 S. Cone D.B.G.

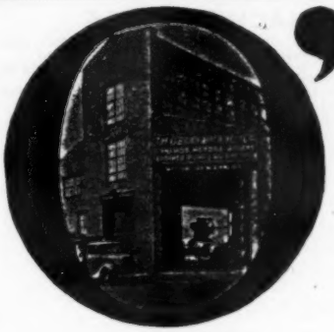
DRILLS, RADIAL

3' American S.P. Gear Box Drive
4' Mueller S.P. Gear Box Drive
5' Fordick S.P. Gear Box Drive
5' Bickford S.P. Gear Box Drive

MISCELLANEOUS

2A Milwaukee Miller S.P. Drive
16" G & E Shaper S.P. Cone Drive
24"x6 Cinci. Planer 1 Head on Rail
24" American Shaper Cone Drive
10' Dreis & Krump. 3/16" Cap. Power Square Shear

JONES MACHINE TOOL COMPANY • 528 E. Front St., Cincinnati, Ohio



Note well this name

O'BRIEN

OF PHILADELPHIA

MACHINE TOOLS
POWER PLANT EQUIPMENT

AUTOMATICS
1-¾" Gridley 4 spindle Automatic.
#75 National Acme 4 spindle Automatic 1¾" cap.

AIR COMPRESSORS
1722 cu. ft. Chicago-Pneumatic, size 23"x13"x16", type OCE; direct connected G. E. 220 volt, 3 phase, 60 cycle, Synchronous Motor.
868 cu. ft. Sullivan, 17"x9-¾"x12"; belt drive.
528 cu. ft. Ingersoll-Rand, type ER; belt drive.
368 cu. ft. Ingersoll-Rand type ER; belt drive.

DRILLS
3' Fosdick Radial, gear box swinging table.
20 spindle #12 Natco, Multi-spindle, head 18"x12".
20 spindle Natco, head 14"x27". #2 M. T.
12 spindle Natco, head 13½" dia., #1 M.T.
4 spindle Foot Burt Rail Drill, #4 taper.

HAMMERS
2000 lb. Chambersburg, double frame steel forging hammer, designed for necking shells, self-contained type.
1100 lb. N.-B.-P. steam forging single tr.

LATHES
54"x16' Johnson mtr. dr. 9' centers.

PIPE MACHINES
¼", 2" Oster No. 300, M.D.
½", 2" Landis, Belt Drive.
1½" to 6" Williams No. 3, M.D.
2½"x8" Williams No. 8 Rapiduction, M.D.

PRESSES
25 ton Henry & Wright dieing machine, single roll feed
No. 2½C Brown inc. stroke 7" bed 17½x14½", fly. 32"x4½".
200 ton Caldwell Hydraulic Wheel Press, 48" between bars, belt drive.

PUNCHES, SHEARS, ETC.
36" Williams & White Punch, arch jaw, belt drive, ¾"x¾" cap.
No. 2 Campbell Nibbler, ⅝" cap., 12" throat.

TURRET LATHES
#6A Potter & Johnson Chucking Machine.
1½ cap. Warner & Swasey, friction head, power feed.
#2 Warner & Swasey Hand Screw Machine, 1" cap. with collets.
#1 Warner & Swasey Hand Screw Machine, ⅝" cap. with wire feed.

MISCELLANEOUS
42" Bullard Vertical Boring Mill, 2 heads, Q.C.
36" Fellows Gear Shaper.
#5 Mitts & Merrill Keyseater.

THE O'BRIEN MACHINERY CO.

CABLE ADDRESS
OBRIEN PHILA

115 N. THIRD ST., PHILADELPHIA, PA.

TELEPHONE
MARKET 0727

Estimates for complete machine shop equipment

Individual machines and entire plants bought and sold

JOSEPH BEAL & CO.

DEALERS IN HIGH GRADE
NEW MACHINERY & TOOLS USED
TRADE MARK REG

See Joe Beal first - - for these hard-to-get machines and tools

465-471 ATLANTIC AVE. ● BOSTON, MASS.

FOR IMMEDIATE DELIVERY

1—#10 Productomatic (Bilton) Mill
2—#45 Productomatic (Bilton) Mills
4—#3.5 Productomatic (Bilton) Mills

All Machines Motor Driven—Excellent Condition—Priced Low

LOUIS E. EMERMAN & CO.
1761 Elston Ave. Chicago, Ill.

VALUABLE FLOOR SPACE

is going to waste in many plants. New machinery, and production changes necessary to the National Defense Program leave machines idle, taking up precious footage in warehouses and shops.

A letter or wire, giving us inspection privileges will bring a representative, prepared to offer highest cash prices and immediate acceptance of surplus equipment.

Send your lists to:

LAFAYETTE MACHINERY CORP.
6320 E. Lafayette
Detroit, Mich.

QUICK DELIVERY

GEAR CUTTING MACH.
#6A Cin. 72 x 20" M.D.

PLANERS OPENSIDE
36 x 14 Ft. Detrick & Harvey; 26 x 8 Ft. Cleveland; 36 x 10 Am; 30 x 8 Gray; 36 x 8 Ft. Niles.

SHAPERS
28" & 24" G & E S.P.D; 28" Rockford MD; 20" Queen City S.P.D; 20" Cin; 16" S & M; 24" P & J Univ. Table.

GRINDERS SURFACE
15" x 15" x 96" Norton Openside; #2 W & M; Sprgfld Vert. Type Surf.

GRINDERS CYL.
24 x 144 Landis Self contained; #12 B & S; 10" x 36" Norton; 12" x 42" Landis Univ.

LATHES GEARED HEAD
Am. 24" x 10 Ft.—24" x 12 Ft.—18" x 8 Ft.; Bridgefore 36 x 16 Ft.; 20 x 10 Reed Prentice; 18 x 9 Bradford; 16 x 6 and 16 x 8 P & W; 22 x 16 Ft. Hamilton.

LATHES FLOOR
36 x 20 Ft. New Haven; 36 x 20 Harrington; 52 x 22 Ft. Fitchburg; 36 x 14 Ft. Sprgfld; 24 x 12 Bradford; 27 x 9 Bridgefore; 18—36 x 12 Ft. Putnam Gap.

PLANER TYPE MILLS
Ingersoll 30" x 144" 2 heads; 24" x 18 Ft. 4 heads.

LATHES TURRET UNIVERSAL
W & S—#1A—276,000 serial; #2A W & S—200,000 serial; #4 & #6 W & S; Gisholt 24" and 28"—6¼ hole.

MILLERS DBLE OVERARM
#4B Brown & Sharpe Motor in base R.T.; #3B Kearney & Trecker (4); #2B K & T Univ.

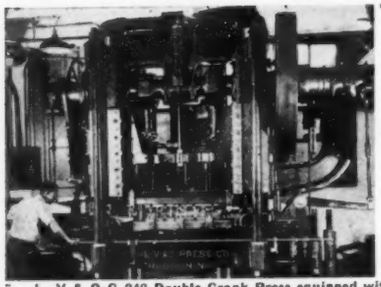
MILLERS S.P.D.
#2 Cin. Hi-Power; #4 Cin; #3A & #4A Brown & Sharpe Univ; #2 Rockford; #5 LeBlonde.

LARGE PRESSES
#4019 Hamilton; 133" Clearing; #6010 ¼ Hamilton; #80½ Bliss 32" stroke; #78½ Bliss 24" stroke; #268¼ Tol. Toggle.

Listen to our Radio Program every Sunday at 10:15 A.M., C.S.T. over WJJD Chicago.

Send for Our Latest Catalog 404

INTERSTATE MACHINERY CO., INC.
1439 W. Pershing Rd.,
Chicago, Ill.



1—V & O G-848 Double Crank Press equipped with Double Roll Feed and Scrap Cutter. All Bronze Bushed throughout, Counterbalanced Ram and ideal for Progressive Die Work. Like new.

PRODUCTION MACHINERY

BLISS 5-38" D.C. Geared Press M.D.
CONSOLIDATED 72" x 36" D.C. Geared Press.
TOLEDO #204A D.C. Gap Frame Geared Press.
TOLEDO #201E D.C. Gap Frame Geared Press, M.D.
FERRACUTE 48" D.C. Geared Press.
BLISS Nos. 1, 1½, 3½ & 4 Toggle Draw Presses.
BLISS, TOLEDO & V & O Inclinable Presses—All Sizes.
WELLS #12 84" Gang Press Motor Driven.
NIAGARA #26 Arch Press, like new.
WATERBURY Dial Presses & V & O #101, 102, 103 & 104 Redraw Presses for cartridge shells.
WATERBURY, MANVILLE & NATIONAL Bolt, Nut, Screw, & Rivet Machinery & Thread Rollers.
TIN CAN MACHINERY—All Types.
NILSON & BAIRD Four Slide Wire Formers.
SLEEPER & HARTLEY #2½ & 4 Spring Coilers.

MACHINE TOOLS

B. & S. #3 Univ. Miller with Dividing Heads and Vise, Power Rapid Traverse. Practically New.
BEMENT 4½ Bar Table Type, Horizontal Mill new in 1924, Motor Driven.
60" VERTICAL Hi-Duty Boring Mill with 2 Swivel Heads on cross rail, Single Pulley Drive.
SELLERS 4 Head Planer, 36 x 36 x 8 ft.
INGERSOLL Slab Miller 24 x 24 x 8 ft.
BECKER #3 Vertical Miller.
KNIGHT #1½ Vertical Miller.
B. & S., REID & AMERICAN #2 Grinders.
GOULD & EBERHARDT 16" Shaper.
B. & S. #3 Planer Type Grinders.
B. & S. #12 Cylindrical Grinder.
WARNER & SWASEY & FOSTER Turret Lathes.
LATHES from 9" to 60" swing, 3 to 20 ft. beds.

NATIONAL MACHINERY EXCHANGE
130-140 MOTT ST., NEW YORK, N. Y.

HI-GRADE MACHINE TOOLS
for IMMEDIATE DELIVERY

#3A **WARNER & SWASEY** Univ. Turret Lathe.
#2A **WARNER & SWASEY** Univ. Turret Lathe.
2¼"x11" **ACME** Turret Lathe P.F. to turret.
#2 **WARNER & SWASEY** hand Screw Machine, 1" cap. P.F. to turret, motor in base.
#1 **BROWN & SHARPE** wire feed hand screw machine, ⅝" cap.
#1 **FOSTER** wire feed hand screw mach, ⅝" cap.
#0 **B & S** wire feed screw machine, ⅜" cap.
12"x6' **HENDEY** geared hd, taper att. collets, M.D.
14"x6' **HENDEY** geared head, taper att. M.D.
14"x8' **SIDNEY** 3 step cone, D.B.G., Q.C.G. taper att.
16"x6' **HENDEY** mtr. mounted on bracket, taper att.
16"x10' **FIL SMITH** 12 speed geared head, M.D.
20"x12' **SIDNEY** 3 step cone, D.B.G. motor mounted on bracket, taper att.
24"x14' **LODGE & SHIPLEY** 3 step cone D.B.G., Q.C.G., taper att. raising blocks to increase the swing to 38".
#608 **RIVETT** bench lathe, mounted on oak cabinet, motor in base, all attachments.
12"x54" **LANDIS** Plain Grinder, self-contained countershaft.
8"x20" **FRASER** Universal Grinder.
24" **POTTER & JOHNSON** back geared Shaper, universal table.
3' **AMERICAN** Radial Drill, tapping attach, small table, oil grooved base, mtr dr. thru gear box.
Single spindle **AVEY** high speed B.B. Drill, M.D.
3 spindle **AVEY** high speed B.B. Drill, B.D.

Frank Toomey Machinery Company
116 N. THIRD ST. PHILADELPHIA, PA.
WALNUT 5575.

SPECIAL SALE—THIS $28.00 DEMAGNETIZER at $12.50 Net

110 Volt. 60 Cycle. 600 Watt. Complete with Cord and Switch. Takes up to 4" Diameter Work Thru Hole.

A REAL BARGAIN

Send Orders in While Our Stock Lasts.

"SEND FOR OUR LIST OF BARGAINS"

DE WITT TOOL CO. 173 Grand St. New York City

SELECTED TOOLS

1—**BULLARD** 36" Vertical Turret Lathe, Rapid production type, with New Era Turret head and side head.
8—**HEALD** #75 Internal Grinders 15" dia. 8" depth.
1—**POTTSTOWN** 4-station 3-way 8-spindle automatic Tapping Machine up to 1½", motor drive
1—Brand new **WADE** high precision Bench Lathe swing 8½", between centers 20", collet capacity 1", complete with collets, countershaft, etc.

BAUER MACHINERY COMPANY
1116 Frankford Avenue
Philadelphia, Penna.

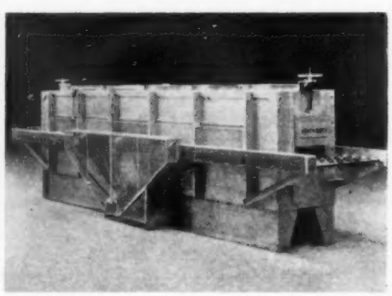
When you need a
HOIST or CRANE
be sure to signal
N. B. PAYNE
105 W. 55 St., New York Tel. Circle 7-6730

FOR SALE
GRINDER

One No. 14 Standard Double Disc Gardner Grinder, rebuilt. With Cantershaft complete. Cheap for quick sale.

FS-957, American Machinist,
330 West 42nd St., New York City

HEVI DUTY ROLLER HEARTH ELECTRIC FURNACE



Chamber 8" wide, 12" high, 19' long. 69 K.W., 1850 deg. operating temperature. Suitable for the heat treating of long narrow, or small objects, such as alloy beams, discs, and other similar items.

All inquiries will be given prompt attention

LOUIS E. EMERMAN & CO.
1761 Elston Ave. Chicago, Ill.

"I get some very nice inquiries through my AMERICAN MACHINIST advertising"

The foregoing is quoted as the comment of a dealer in used equipment whose advertising frequently appears in "Searchlight". The reason he "gets some very nice inquiries" is because—in the Searchlight Section of AMERICAN MACHINIST—the advertising comes to the attention of machine tool buyers throughout the metal-working industry.

Have you equipment for sale? If so, why not let this "Searchlight" advertising help you find buyers?

Departmental Advertising Staff
AMERICAN MACHINIST

IMMEDIATE DELIVERY

Exceptional Machines from an Exceptional Plant

We Offer for Sale

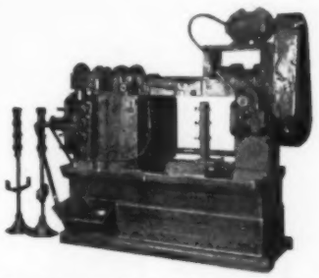
(Conditioned by Happy, Satisfied Mechanics)

P & W 12" Vertical Surface Grinder (SB 1092)
Becker #6 Vertical Miller—Power Feeds (SB 1096)
Becker #5B Vertical Miller—2 Mtr Drive (SB 1113)
B & S #2A Universal Miller, All Geared (SB 1109)
Hendey Tool Room lathe Grd Hd, Mtr Drive (SB 1093)
MILWAUKEE #2 Vertical Miller, Mtr in base (SB ——)
P & W #5 Die Sinker Miller (SB 1006)
G-K lathe 18x8 Grd Head, with taper-Mtr D (SB 1026)
B & S #00 Auto (SB 896)
Foster #4 turret lathe (SB 1135)
B & S #1 Univ Grinder (S 1122)
B & S # 2 Univ Grinder (S 1010)
B & S #11 Plain Grinder (S 1023B)
Heald #22 Rotary Grinder (S 924)
Norton 10x36 Plain Grinder (S 990)
G & E Gear Cutter 85"x16" (S 993)
B & S #5 Gear Cutter 48" (S 1137)
Cinn. #4A Gear Cutter 48" (S 698)
Natco #30 M S Drill (S 1128)
Cinn. Bickford 6' Plain Radial—Enclosed Head, Gear Box, Mtr Drive (S 921)
Lodge & Shipley lathe 36"x20' Heavy Duty (S 417)
NEW Hardinge Precision Universal Miller (SB 1090)
Ohl 8' Power Shear (S 894)
Niagara 62" Power Shear Heavy (S 605)

YOUR INQUIRIES AND OFFERINGS SOLICITED

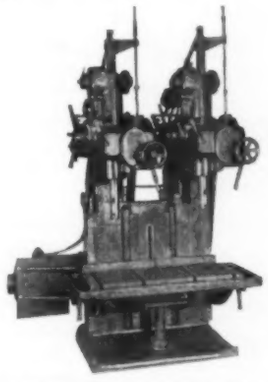
HASCO
Segal Services

663 Frelinghuysen Ave.
Newark, N. J.
Phones Bigelow 3-3486-7-8



4 Sp. Cone Vertical Auto. "Cutoff" Machine. 1" Cap. Motor Driven.

No. 3 Sundstrand Vertical Rotary Rigidmill. Pr. Rp'd. Traverse to Table. Motor Driven.



No. 4 Colburn Heavy Duty 2SP. Mfg. Drill. Motor Driven.

Hundreds of Other Items in Stock

WE SOLICIT YOUR INQUIRIES!

BARR MACHINERY CO.

813 W. Lake St.
CHICAGO, ILL.

Specials ! **IMMEDIATE DELIVERY ! !**

Hand Screw machines—⅞" to 3"—B&S—Acme—Foster—W&S—Gisholt's.
#70 Heald's—#3 Ohio univ. Cutter Grinders.
Automatic Screw machines—⅜" to 3⅜"—1"—4"—6" spindles.

SCOTT MACHINERY SALES, Inc.
1812 W. Carroll CHICAGO
Phone—MONroe: 1690

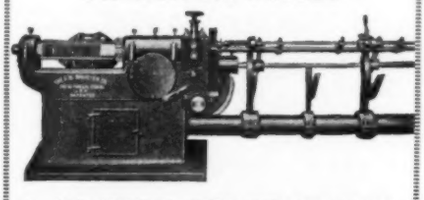
UNUSUAL VALUES

Brakes: Chicago 10' for 18 ga.
Shapers: 24" G&E, 24" Barker
Lathes: 14"x6' Monarch; 14"x8' Young; 24"x12', 26"x16' Draper 4-jaw chuck t.a.
Milling Machines: Type "B" Briggs Hor.
Drill Presses: 28", 24" Hoefer; 25", 20" several high speed
Hack Saw: 6 x6 L.W. high speed
Radial Drills: 5' Bausch
Turret Lathes: ⅝" Acme, 24" Gisholt, m.d.
Miller: 20" x 24" x 18" Ingersoll
Grinders: #20 Bryant Internal; 6 x 15" Fitchburg, plain cylindrical
300 other machinery items
MOTORS—new 5 H.P. for 3-phase, ball brg. $55.75
Other sizes equally low priced. Also rebuilt motors.

THE OSBORNE & SEXTON MACHINERY CO.
COLUMBUS, OHIO

SUBJECT TO IMMEDIATE DISPOSAL

At Lowest Prices



1—⅜" SHUSTER WIRE STRAIGHTENING AND CUTOFF MACHINE
1—¼" SHUSTER WIRE STRAIGHTENING AND CUTOFF MACHINE
1—#6 WELLS WIRE STRAIGHTENING AND CUTOFF MACHINE

All Inquiries Given Prompt Attention

LOUIS E. EMERMAN & CO.

1761 Elston Ave., Chicago, Illinois

IMMEDIATE DELIVERY

76" Bullard vertical Boring Mill, two heads on rail.

Ingersol Slab Mill, 27"x24"x8', adjustable rail.

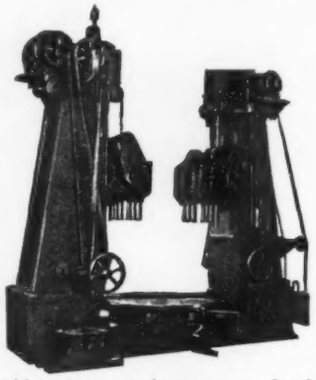
#5 Cincinnati horizontal Milling Machine, Lima M.D. Drive.

#84 Opposed wheel Gardner Grinder, timken bearing, M.D.

LAKE MACHINERY CO.
651 W. Lake St. Chicago, Ill.

SEARCHLIGHT SECTION

1—Beaman & Smith Cylinder Borer and Finishing Machine



Double column production type; head on each column carries 4 spindles, 3½" dia.; overhang of spindles, 18"; length of rail, each head, 32"; with 4-station, 50"-dia. indexing table; each head independently driven by 20 H.P. 220 volt A.C. motor.

Priced at a fraction of original cost

"Send for our latest machine tool listing"

LOUIS E. EMERMAN & CO.

1761 Elston Ave. Chicago, Ill.

"READY TO SHIP"

GARVIN No. 2 and 3 Duplex Millers, countershaft.
WARNER & SWASEY No. 1 and 2 Hand Screw Machines, countershaft.
REED PRENTICE Production Lathes, No. 00 and No. 1 single pulley drive, all equipped with Barker chucks.
FITCHBURG Low Swing Lathes, geared head, S. P. D. 5" x 5' centers.
PRYIBIL 22-44 Gap Spinning Lathe, B.B. Cone.
PRATT & WHITNEY No. 13 Multiple Spindle Drill Press, rectangular head.
ALLEN high speed sensitive drills. 2, 3 and 4 spindle.
NATCO No. 14 Multiple Spdl. drill. 22 spdls. R. A. head 18 x 28" Table 22 x 30", S. P. drive, Serial No. 14,222.
CLEVELAND 2¾" Auto. Model A.
GRIDLEY 1¾" 4 spindle automatic, Model F. countershaft drive.
MAC DONALD Style 135 Can Press with strip feed, automatic oiling system, condition equal to new, Serial No. 32003, motor drive.
NIAGARA No. 7-B Geared Inclinable Power Press, 5" stroke.
BLISS No. 74½ Geared S. S. Press, Tie bar.
BLISS No. 1½ Geared, D. A. Press.
BLISS No. 21 Inclinable Presses, Roller clutch.
YATES-AMERICAN No. 30 Universal Saw Table, 3 phase motor drive, complete equipment.

Other just as desirable tools in our large stock. Send for catalog.

MORRIS MACHINERY COMPANY

97 Chestnut Street - - - - - - - - - Newark, N. J.

MILLING MACHINES

No. 2 Kempsmith Univ. Fully Eqp.
No. 2 CINCINNATI & OWEN Univ.; No. 3 OWEN Univ.
No. 3 BECKER Vertical.

TURRET LATHES

No. 1 CINCINNATI-ACME Full Universal, Geared Head, TIMKEN BEARING, MD. 2½" Spdle.
No. 4 WARNER & SWASEY Univ.
No. 7 FOSTER, Grd. Head, 2½" Sp.
PRATT & WHITNEY Geared Head, 2½" Spindle.
No. 4 BIGGS, F.B.G. Power Feed, 1½ Spindle.
26" Gisholt—2½" Spdle. Taper Attachments.
Nos. 0 and 00 B. & S. Automatic Screw Machines.
24" STEINLE Univ. 4" & 6" Spindle.

LATHES

30"x15' SCHUMACHER & BOYE 25"x10' LE BLOND Heavy Duty.
20"x8' AMERICAN; 18"x10' WALCOTT.
18"x26"x10" RAHN-LARMON Gap; 18"x16' and 14"x6' HENDEY.

MISCELLANEOUS

No. 2 B. & S. Automatic Surface Grinders.
10"x72" B. & S. Plain Cylindrical Grinder.
6' CINCINNATI All Steel Press Brake, ¼" Cap.
RYERSON Universal Iron Worker; Punches, Shears, Angles.
GRAY Roller Die Nibbler, 36" Throat, ⅜" Cap.
D & K Power Shear 6', All Steel Const. 20" Gap—14 Ga. Cap. M.D.
16" GOULD & EBERHARDT & 17" AVERBECK Shapers.
3' MORRIS & 4' 6' BICKFORD Radial Drills.

INLAND MACHINERY CO.

48 So. Clinton St. Chicago, Ill.

AMERICAN GEARED HEAD LATHE, 36"x22', triple geared, geared face plate, geared motor drive, less motor.

BERTSCH SQUARING SHEAR, 8 ft. ¾" cap. 24" gap. Geared motor drive.

ACME EQUIPMENT COMPANY

128 S. Clinton Street CHICAGO, ILL.

No. 32 LUCAS HORIZ. BORING MILL. M.D. 3¾" Bar. TURCHIN HYD. FOLLOWING ATT.
No. 3A W&S Univ. Hol. Hex. Turret Lathe, 4¾" Spdle Hole. SPD. Bar & Chuck Equip.
No. 5 G&L Hydraulic Surf. Grinder. M.D. 10x36" Cap.
No. 3 B&S Universal Grinder. Fully Equipped.
6x48" P&W Thread Milling Machine.
4', 5' and 6' CARLTON RADIAL DRILLS.
No. 70 HEALD INTERNAL GRINDER. CLUTCH IN HEAD TYPE.
20"x12' HENDEY Q.C.G. ENGINE LATHE. TAPER ATT.

GEORGE M. BERNSTEIN & COMPANY

10 S. CLINTON ST. CHICAGO, ILL.

#2 **Brown & Sharpe** Hi-Speed Automatics.
#8 **Marvel** Metal Band Saw, M.D.
#2A **Warner & Swasey** Turret Lathes, S.P.D.
3' **Morris** Radial Drill, S.P.D.
4' **Ryerson** Radial Drill, S.P.D.
#3-¾ **Bliss** Toggle Press.
36"x10' **South Bend** Brake Drum Lathe, M.D.
27"x16' **Lodge & Shipley** M.D. Lathe.
#1½B **Kearney & Trecker** Plain Miller, S.P.D.
#1 **Kempsmith** Univ. Miller, fully equip.
#3 **Kempsmith** Univ. Miller, fully equip.

300 Other High Grade Tools In Stock!

VICTOR MACHINERY COMPANY

135 S. Clinton Street CHICAGO, Illinois

BORING MILLS!

3" Horizontal, Floor Type.
42" Gisholt Vertical, 2 Hds., S.P.D.
51" Bullard, Vertical, 2 Hds., Cone Drive.

TURRET LATHES!

2—No. 4 Foster, Power Feeds, 1½" Cap.
Millholland, 1¾ Cap. Bar Feed, Pan Bed.
18" Model A, Libby, Motor Drive.

Partial list—Send Us Your Inquiries!

SEGAL MACHINERY CO.

123 S. Clinton St. CHICAGO, ILL.

IMMEDIATE DELIVERY

2—#1 Cincinnati-Acme Full Universal Turret Lathes; geared head AC motor driven, 2½" bar capacity with roller bar feed, thread chasing and taper attachments. Complete equipment.

INLAND MACHINERY CO.

48 S. Clinton St. Chicago, Ill.

At Your Service

—the Searchlight Section of the McGraw-Hill publications is at your service for bringing business needs or "opportunities" to the attention of men associated in executive, management, sales and responsible technical, engineering and operating capacities with the industries served by McGraw-Hill publications.

NEW ENGLAND HEADQUARTERS FOR MODERN MACHINE TOOLS

(THE SUPREME MACHINES OF INDUSTRY)

GENERAL MACHINERY CORPORATION

"THE MACHINE TOOL MERCHANTS"

John P. Tierney, Manager

140 FEDERAL STREET, BOSTON, MASSACHUSETTS TELEPHONE: LIBERTY 4826

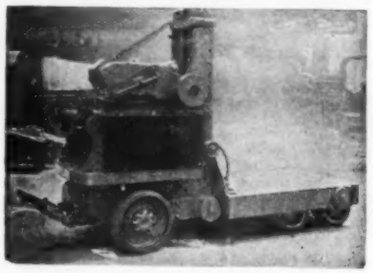
WORLD'S LARGEST STOCK POWER PRESSES

No. 7 Bliss, double crank, tie rod, 45" crank 7"—8"
No. 5C Bliss, double crank, tie rod, 54", crank 5"—5½"
No. 65E Niagara, gap, grd., double crank, 72"
No. S 206 Ferracute, double crank 124", crank 7½"—9" (2)
No. SG 107 Ferracute, dbl. crank, 96", crank 5½"
STG 103 Ferracute gap, double crank gap
Nos. 93B, 91C, 90D, Toledo double crank presses
No. 2719 Hamilton, straight side, tie rod, crank 13"—19"
Nos. 74½, Bliss geared, straight side
No. 77 Consolidated geared, open back
No. 58 Niagara, geared, straight side
Nos. 54, 55, 55½, 56, 57 Toledo, geared straight side
Nos. 3½B & 3½C Bliss toggle presses
No. 164½ Toledo toggle, press
Nos. PA3 Ferracute & 13 Toledo horning
No. 662 Toledo, 250 ton knuckle joint, coining
75 ton EG 51 Ferracute; 400 ton Waterbury-Farrel, knuckle joint, coining
200 ton No. 59 Bliss, 250 ton Waterbury F. coining
150 ton EG52 Ferracute
Bliss roll forming machine, 5 pairs rolls for stock up to 28" wide, 4" bearings, weight 25,000 lbs.
Squaring shears, various sizes
Gang slitter, 60", Lamb & Nash (Braddock) type H.
These and hundreds of others of popular makes and sizes, are in stock at our warehouse here.

Rebuilt and Guaranteed

Joseph Hyman & Sons

Tioga and Almond Sts., Philadelphia, Pa.



Elwell Parker Hi-low Tructor

Type ELB20
Capacity 10 tons
Area of platform 44" x 62"
with batteries
Practically New—Immediate Delivery

Write—phone—wire

LOUIS E. EMERMAN & CO.
1761 Elston Ave. CHICAGO, ILL.

TURRET LATHE

1—**Warner & Swasey** Turret Lathe—Size 2A, Hollow Spindle. Excellent Condition.

Make Your Best Offer!

FS-970, American Machinist
330 W. 42nd St., New York City

TURBINE GENERATOR

TURBINE DELAVAL Serial #65311
Non-condensing
Steam #150 Exhaust 5# Speed 3600 R.P.M.
Steam Inlet 4" with separator
Exhaust 10"
GENERATOR ALLIS-CHALMERS (A.C.)
60 K.W. Serial #119985
60 K.W. 3 P. 60 Cycle 181A—240 V. 80% P.F.
EXCITER Serial #119986

Apply

ROBERTSON ART TILE CO.
TRENTON NEW JERSEY

WE BUY **WE SELL**

REEVES DRIVES

No. 000 to No. 8—All types

SPEED REDUCERS

All Ratios Up to 200 Horsepower

ALL DRIVES OVERHAULED

Money Back Guarantee

PATRON TRANSMISSION CO.
158 Grand St. New York City

YOUR INQUIRY WILL HAVE SPECIAL VALUE

if you mention that it is in response to advertising in the Searchlight Section of AMERICAN MACHINIST. Advertisers value such acknowledgments highly; so does the publisher. You benefit—as a reader—in the enlarged future service such acknowledgments help to make possible.

Departmental Staff

AMERICAN MACHINIST

330 W. 42 St., N. Y.

GRINDER FOR SALE

#2—12x36—Plain Cincinnati Grinder, Serial #B294. Belt Driven. Overhead Countershaft. This machine hasn't been used very much and is in first class condition.

MODERN AUTO REPAIR CO.
4601 Olive St. Forest 6500, St. Louis, Mo.

Planers, Milling Machines
Drill Presses, Grinders
Shapers, Lathes, Boring Mills

Monarch Machinery Co.

325 No. 3rd St., Phila., Pa.
All Monarch Machine Tools Are Sold on Approval

INGERSOLL Planer-Type Milling Machine

Adjustable Rail; Single Vertical Head; on cross rail;
Size: 42" between uprights; 36" under rail. 14' table.
Used, good condition. Shipment from Ohio.
BARGAIN PRICE on APPLICATION.
FS-971, American Machinist
330 W. 42nd St., New York City

Turret Lathes—Boring Mills—Grinders

ETC.

BOUGHT—SOLD—RE-BUILT

Full particulars & Price in first letter.

JOSEPH VAILLANCOURT
108 Elm St. Albany, N. Y.

FOR SALE

COMPRESSOR

Bury Class URB 8x12 Single Stage Compressor 188 CFM Displacement for inlet pressure of 350# and discharge pressure of 500#. No motor or belt. New Condition.

Murray Const. Equipment Co.
566 Elk St. Buffalo, N. Y.

Drill, Radial 6' Cincinnati-Bickford, M.D.
Gear Planers Bevel, 54" Gleason, M.D. (2)
Gear Cutter Spur, 84" Newark, M.D.
Lathe, 42"x20' Springfield Heavy Duty, B.D.
Miller, Duplex, 36"x36"x10' Ingersoll, M.D.
Post Mill, 6½" bar Niles, R.P.T. M.D.

LANG MACHINERY COMPANY

28th Street & A.V.R.R. Pittsburgh, Pa.

EMERMAN RED BOOK
Machinery Tools and Supplies
HEADQUARTERS FOR ALL TYPES OF USED METAL WORKING MACHINERY— STAMPING PRESSES—STRUCTURAL TOOLS
LOUIS E. EMERMAN AND COMPANY
1761 ELSTON AVE. CHICAGO TEL. BRUNSWICK 4130
—Also FORGING EQUIPMENT—HYDRAULIC EQUIPMENT
—Our Stock is Large and Varied
—Our Prices Represent Real Values
SEND US YOUR INQUIRIES

SEARCHLIGHT SECTION

EMPLOYMENT • BUSINESS • OPPORTUNITIES • EQUIPMENT—USED or RESALE

UNDISPLAYED RATE:

10 cents a word, minimum charge $2.00.
(See ¶ on box Numbers.)

Positions Wanted (full or part-time salaried employment only), ½ the above rates.

Proposals, 50 cents a line an insertion.

INFORMATION:

Box Numbers in care of any of our New York, Chicago or San Francisco offices count 10 words additional in undisplayed ads.

Discount of 10% if full payment is made in advance for four consecutive insertions of undisplayed ads (not including proposals).

DISPLAYED—RATE PER INCH:

The advertising rate is $6.00 per inch for all advertising appearing on other than a contract basis. Contract rates quoted on request.

An advertising inch is measured ⅞ inch vertically on one column, 3 columns—30 inches—to a page. A.M.

NEW ADVERTISEMENTS received by 10 A. M. January 28th will appear in the issue of February 5th subject to limitations of space available

POSITIONS VACANT

"CAPABLE DESIGNERS WANTED, who have had wide experience on Medium and Heavy machine tools. Location, Southern Ohio. P-926, American Machinist, 520 N. Michigan Ave., Chicago, Ill.

DIEMAKERS WANTED: We have steady work at high rates of pay for a few real high grade men. We also can place younger mechanics with four or six years experience who are ambitious and can learn fast. We have the best grade of compound and progressive die work to manufacture. Write to Moore Special Tool Co., Inc., 740 Union Avenue, Bridgeport, Conn.

DIAMOND TOOL MAKERS, all around experienced, with mechanical knowledge, capable of manufacturing shaped tools of all kinds, drill bits, phono points, wire dies, etc. Good future. Anton Smit and Company, Inc., 24 State Street, New York, N. Y.

MECHANICAL DRAFTSMEN WANTED by Oil Field Equipment manufacturer. Give experience, references, and photo. P-968, American Machinist, 520 N. Michigan Ave., Chicago, Ill.

POSITIONS WANTED

INDUSTRIAL AND COST ENGINEER: seeks position with Industrial Company. Thoroughly grounded and experienced in Production Coordination, Planning, and Control, Standards, Costs, Budgets. PW-961, American Machinist, 330 W. 42nd St., New York, N. Y.

TOOL ROOM FOREMAN—25 years experience on drill jigs and fixtures. Capable to design own tools, qualified to handle large force of tool makers. Now employed, but available on short notice. Best references. PW-962, American Machinist, 330 W. 42nd St., New York, N. Y.

TOOL DESIGN SUPERVISOR AVAILABLE: Will cut your costs; solve your manufacturing difficulties with simple effective tools. PW-965, American Machinist, 330 W. 42nd St., New York, N. Y.

POSITIONS WANTED

JUNIOR MANUFACTURING EXECUTIVE: 35 years old, married, with family. College training in mechanical engineering & home study in cost accounting. Now employed as designing engineer by tool and die job shop. 15 years experience as tool designer, checker, chief tool designer, time study observer, consulting industrial engineer (independently and with Consultation firms) on wage incentives, cost accounting, cost reduction, purchasing and production control and other office and factory forms, systems and routines. Served 5 years in temporary semi-consulting capacity with various firms employing from one to six hundred workers and engaged in light and heavy, rough and precision metal manufacturing as plant manager, assistant to president and as General Manager. Very successful dealing with both CIO and AFL Union Labor. Earnings past eight years average $5,500.00. Now desire $6,000.00 but will consider less for right job with stable employer, assured permanency and definite opportunity for advancement over long pull. Location immaterial. Address PW-963, American Machinist, 520 N. Michigan Ave., Chicago, Ill.

TECHNICAL MEN

We invite applications from those interested in the following type of positions:
Works Manager, Plant Superintendents, Mechanical & Electrical & Chemical Engineers, Designers, and Estimators. Positions open paying excellent salaries. No advance fees.

CLEVELAND VOCATIONAL BUREAU
317 Schofield Bldg. Cleveland, Ohio
Detroit office
810 Griswold Bldg. Detroit, Michigan

POSITIONS WANTED

GENERAL MANAGER — Mature, Profit-minded, Dependable. Has successfully managed four companies—two taken out of the red. Available for service shortly with medium-size company requiring reliable directing ability in management, sales, finance and production. Excellent experience machinery, tool, foundry and related lines. Address PW-964, American Machinist, 330 W. 42nd St., New York, N. Y.

ENGINEERING EXECUTIVE AVAILABLE. Technical graduate, twenty years experience, mostly executive, in the design, manufacture and sale of special machinery, machine or small tools. Recognized authority on metal cutting. PW-966, American Machinist, 330 W. 42nd St., New York, N. Y.

PLANT MANAGER—Superintendent—Production Manager. Technically trained mechanical engineer and industrial manager, 10 years practical experience in construction, manufacturing and precision machine tool fields. 10 years executive experience with successful records for executive, organizing, engineering and inventive abilities. An inherent engineer with the inventive imagination necessary to efficiently supervise selection of machines, tools, fixtures and methods. Experienced in modern production methods including time-study, performance standards, standard tooling and incentive systems of wage payment. Can take complete responsibility for management of plant and produce results. Available for permanent connection where full capabilities can be applied. 39 years old. Satisfactory reason for considering change from present position. Location immaterial. PW-967, American Machinist, 330 W. 42nd St., New York, N. Y.

BUSINESS OPPORTUNITIES
and
"WANTED" Advertising
on Page 399

Machine—Tool Rebuilding Service

Quoted from the EDITORIAL page, December 11, 1940 issue of AMERICAN MACHINIST

"Much machinery, though it has seen considerable service, can be rebuilt or retooled for a defense job with a minimum of delay. Plants which can competently put those machines rapidly into shape for the new tasks exist in this country."

The attention of readers of AMERICAN MACHINIST is directed to the advertisements of "Plants which can competently put those machines rapidly into shape" as indexed at the foot of page 373, this issue.

Are You Looking for a Building or Site?

Write for this Catalog

Save time and money . . . Come to NICRE first for the most desirable offerings. All inquiries held in strictest confidence.

REALTY POCKET BOOK

The NICRE — THE KEYSTONE SERVICE OF ASSOCIATED BROKERS

The Central Listing Bureau for Your Property

NATIONAL INDUSTRIAL & COMMERCIAL REALTY EXCHANGE, INC.

A Nation-wide Industrial Property Realty Exchange

401 Broadway New York City

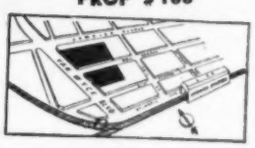
PROP # 162

62,200 sq. ft.

PROP # 163

125,502 sq. ft.

PROP # 186



120,000 sq. ft.

PROP # 144

700,000 sq. ft.

PROP # 194

90,000 Sq Ft,

PROP # 123

69,000 sq. ft.

PROP # 196

67,000 Sq Ft,

PROP # 177

42,500 sq. ft.

PROP # 169

90,000 sq. ft.

PROP # 155

62,000 sq. ft.

How to take the "CHASE" out of PURCHASE

If you are selling or leasing your property, write for this booklet

PLEASE SEND ME COPIES OF

☐ "Realty Pocket Book"

☐ "How To Take the 'Chase' Out of 'Purchase' ".

Name .....

Address .....

City .....

(Continued from preceding page)

PATENT ATTORNEY

PATENTS—Booklet free. Highest references. Best results. Watson E. Coleman, Patent Lawyer, 724 Ninth Street, Washington, D. C.

FREE BULLETIN

CATALOG 393 with supplementary list of "Latest Arrivals". Interstate Machinery Co., Inc., 1439 W. Pershing Rd., Chicago, Ill. "Over 2,000 New and Rebuilt Machines in Stock." Metal Fabricating—Structural Steel—Sheet Metal. Production Machinery—Machine Tools. 8½ x 11, 56 pages, classified, Indexed.

WANTED

ANYTHING within reason that is wanted in the field served by American Machinist can be quickly located through bringing it to the attention of thousands of men whose interest is assured because this is the business paper they read.

PROFESSIONAL SERVICES

Machine Tool Designing Engineers

30 Years Experience in Designing, Building & Developing Production Machinery & Processing Operations

Automotive — Tractor
Airplane — Munitions

W. K. Millholland Machinery Co.
Indianapolis, Indiana

FOR SALE AT A BARGAIN PRICE
THE GREAVES-KLUSMAN TOOL CO'S LATHE BUSINESS

All drawings, patterns, jigs, tools, fixtures, parts inventory, etc., for the complete line.

All sizes from 14" to 30" inclusive. Geared Head Single Pulley Drive and Cone Head Types: Accessories, etc.

These high grade engine lathes have been on the market over forty years.

J. T. ROWELL
3618 Colerain Ave. Cincinnati, Ohio

COMPLETE MACHINE SHOP FOR SALE

Opportunity to purchase complete shop and profitable business. Owner must retire. For full details write

BO-948, American Machinist
330 West 42nd St., New York City

FOR SALE
PATTERNS & DETAIL DRAWINGS OF SURFACE GRINDER

7"x20" Mechanical Feed Excello Spindle. Sample Machine has been operating successfully for two years in plant production.

FS-969, American Machinist
330 W. 42nd St., New York City

Repair of
DIAL INDICATORS
all types, quick and reliable service.
INDEPENDENT GAUGE & TOOL CO.
55 West 42nd Street New York City, N. Y.

For Every Business Want
Think "Searchlight" First!
"Searchlight" is the classified advertising of Employment, Equipment and Business Opportunities in American Machinist. It reflects current opportunities, both offered and wanted. Use it for your business wants.

WANTED

WANTED TO PURCHASE FOR CASH Or To Rent

COMPLETE PLANT for manufacture of medium sized machine-tools consisting of Lathes, Planers, Millers, Grinders and General Engineers Tools. Would prefer plant in leased premises in eastern states.

W-960, American Machinist
330 West 42nd St., New York City

LIQUIDATIONS and APPRAISALS
WE BUY AND SELL
Write us for Quotations on good Used Tools!
H. F. WOLNICK MACHINERY CO.
9 S. Clinton St. CHICAGO

WANTED
USED METAL TAGGING MACHINE
For stamping metal tags with numbers and letters. Address
WILSON-WEESNER-WILKINSON CO.
108 Fatherland Street
NASHVILLE, TENN.

PARKER MACHINE COMPANY, INC.
Before releasing your
SURPLUS MACHINE TOOLS
please contact us. All types of leading make machines wanted if in good condition.
150 BROADWAY NEW YORK, N. Y.

MILES' QUALITY TOOLS

AUTOMATICS

Gisholt Simplimatics
1¼", 1¾", 2⅝", 3¼" & 4¼" Gridley.
1" Cleveland Mod. J dbl. end.
1⅝", 2", 2¼" Acme 4 spdl.
1½" Cleveland "M" 4-spindle.
1" & 1⅜" New Britain 6 spindle.
Nos. 24, 33 & 34 New Britain.

BROACHES

No. 2S LaPointe hydraulic.
No. 3 Oilgear hydraulic.
No. 3 American rack type.
No. 3 J. N. Lapointe double.
Nos. 1, 3 & 4 Lapointe.
2 ton American vertical.

COMPRESSORS

49', 6"x6" Curtis vertical.
67', 6"x6" Chicago NSB.
106', 7½"x6" Chicago NSB.
136', 8"x8" Ing. Rand, ER1.
136', 8"x8" Chicago, NSB.
166', 8"x9" Ingersoll Rand ES1.
218', 10"x10" Chicago NSB.
265', 9½"x12" Worthington.
355', 12"x10" Inger. Rand. ER1.
369', 12"x10" Chicago, NSB.
550', National type 3VD.
620', 14"x8¾"x10" Sullivan WJ3.
676', 15"x9¼"x12" Ingersoll Rand.
706', 17"x9¾"x12" Sullivan angle WJ3.
860', 17"x10"x12" Chicago, OCB.

DIAMOND BORERS

Coulter 2 spindle vertical.
Barnes heavy horizontal.
No. 45 Excello horizontal.

DRILLS

21", 24", 28" Cincinnati.
20", 23", 26" Rockford.
21" & 24" Weigel.
21", 24", 28" Superior.
30" Snyder.
No. 2 Colburn, 1, 2, 3 & 4 spdl.
Nos. 121, 217, 314, 315, 416 Baker.
20" Minster No. 9.
20" Barnes No. 320.
20" & 24" Barnes All Geared.
26", No. 263 Barnes, tapping.
24", No. 25 Foote Burt.
24", No. 4 Colburn.
Nos. 11, 12, B12, C12, 13, C13, 14, B14, 30 & 32 Natco multiple.
8 spdl. No. 1 Baush multiple.
No. 13 Pratt & Whitney mult.
Nos. 0, 00S & 1S Garvin duplex.
Barnes double end (two way).
Baker 2 way horiz. hydraulic.
Nos. 6D, 10D, 11D and 16D Moline Holehog.
No. 15½F Foote-Burt.
4 spdl. No. 17 Foote-Burt rail.
5-spdl. Detroit automatic.
Foote Burt heavy 3 way.
8 spdl., No. 10D Moline cylinder boring.
3' Cint. Bickford radial.
3' & 4' Dreses radial.
3½' Morris radial.
3½', 4', 5', 6' Western radial.
4' Hammond radial.
5' American univ. radial, motor on arm.
6' N-B-P univ. radial.
All sizes & makes sensitive.

FORGING & STRUCTURAL

No. 3B Nazel air hammer.
400 & 600 lb. Chambersburg board drops.
1½" Acme upsetters.
1½", 2½" & 4" Ajax upsetters.

FORGING & STRUCTURAL (Cont.)

⅜" Manville cold header.
Nos. 8 & 25 W & W bulldozers.
26", ¾x¾ Cleveland punch.
12", 1¼"x1" L. & A. punch.
No. 1A Ajax forg. rolls.

GEAR MACHINERY

No. 12 H.S. G. & E. hobber.
Nos. 1 & 5AC Lees Bradner.
Nos. 3 & 12 Barber Colman.
Nos. 3 & 4 B. & S. auto. spur.
36" & 28" G. & E. auto. spur.
24" Gleason bevel planer.
2 spindle Lipe chamferer.
Gleason bevel gear testers.
National Tool worm grinder.
Pratt & Whitney worm grinder.

GRINDERS

Norton—6"x32", 10"x36", 10"x50", 14"x50" & 14"x72".
Landis—10"x24", 10"x50", 12"x36", 12"x52" & 12"x72".
8"x38" Manhattan surface.
9"x30" Bath surface.
12"x36" Diamond Surface.
16"x50" Safety surface.
8" & 12" Arter surface.
84" Diamond face.
Nos. 1 & 2½ Bath universal.
No. 184 Greenfield tool.
No. 2 Ohio tool & cutter.
Gisholt tool & cutter.
24" Ingersoll tub.
18", 24", 30" & 53" Gardner disc.
24", No. 221 Badger disc.
24", No. 84 Gardner disc.
17"x36"-48" Norton hydraulic crankshaft.

ENGINE LATHES

12"x5' Pratt & Whitney tool T.A.
12"x6' Monarch, T.A.
14"x6' Walcott.
16"x6' Monarch.
16"x6' Hendey.
16"x6' Cincinnati.
10"x10' LeBlond, Taper & relieving attachments.
18"x6' American.
18"x8' Walcott.
21"x18' LeBlond.
22"x12' Morris geared head.
23"x10' Rahn Larmon.
24"x10' Lodge & Shipley grd. hd.
24"x10' LeBlond, DBG.
24/48"x10' Rahn Larmon gap.
24"x12' Lodge & Shipley.
24"x16' Schumacher, Boye.
26"x11', 26"x13' Wickes.
32"x13' Lodge & Shipley.

TURRET LATHES

2½x26 Pratt & Whitney.
3"x36" & 4"x34" J. & L.
2 spdl. Jones & Lamson.
21" Gisholt.
24" Steinle.
No. 2 SP Garvin.
No. 4 Bardons & Oliver.
24" Bullard, no side hd.

LATHES, MFG.

9"x14" & 9"x20" Porter Cable.
9" Sundstrand Mfg.
13"x6' Automatic threading.
16"x6' Monarch Mfg.
16"x10' LeBlond Mfg.
17"x5' & 6' LeBlond Mfg.
17"x6' & 8' LeBlond grd. hd. Mfg.
18"x7½' Wickes Mfg.
18" Gisholt Simplimatic.
20"x8½' Wickes Grd. Hd. Mfg.
Melling cam shaft lathe.
No. 9 LeBlond Multicut.
11"x4' LeBlond grd. hd. Mfg.
Wickes center drive crankshaft.
Melling 6 spindle crankshaft.

MILLERS

No. 4 Cincinnati univ.
No. 4 LeBlond universal.
48" Ohio tilted offset.
No. 2M Potter & Johnston automatic.
36", 60" & 72" Ingersoll rotary.
48" Newton rotary.
Ingersoll hydr. profiler.
Kent Owens semi-automatic.
Nos. 1 & 1A Davis Thompson drum.
28", 37" & 42" Briggs mfg.
No. 1 American. Lincoln type.
Bilton Productomatic.
Pratt & Whitney bench miller.

MILLS, BORING

36" Niles car wheel.
40" Bullard.
42" Bullard.
42" Detrick & Harvey.
52" Gisholt.
60" Colburn.
61" Bullard Maximill.

PLANERS

24" Cincinnati crank.
24"x24"x8' Rockford.
32"x32"x12' Niles.
56"x56"x16' Gray.

PRESSES

750 ton Southwark triple action hydraulic toggle drawing. 142½" between uprights, 84" shut height, 550,000 lbs.
600 ton No. 684B Toledo coining.
No. 661 Toledo, 100 ton coining.
100 ton French Oil Machinery Co., hydraulic press.
108" No. 796¼D Toledo Double Crank Toggle Drawing.
No. 1½B Bliss toggle.
No. 164 (173) Toledo toggle.
No. 180 Toledo toggle draw.
No. DDG54 Ferracute, cam draw.
48", No. 6A Bliss double crank. Tie rod frame, roll feed.
45", No. 151 Ferracute Dbl. Crank.
28", No. 71 Swaine double crank.
No. 21½ Bliss Consolidated OBI.
Waterbury Farrel O.B.I. 4½" shaft.
No. 6 Bliss Consolidated O.B.I.
No. 6 Toledo O.B.I.
Nos. 75 & 76 grd. Toledo.
Waterbury Farrel openback, 3½" cr.
Fremont openback, 4⅛" crank.
No. P2 Ferracute.
No. EG35 Erie punching.
No. 94 Consolidated Punching.
Nos. 55, 55½, and 56 Toledo, Straight Side.
No. 65 Consolidated S.S.
No. 4 Massillon S.S.
No. 7 Rockford, straight side.
No. 8-7 Zeh & Hahnemann, straight side.
No. 74½ Bliss, straight side.
No. 30¾ Bliss, arch frame.
No. CA 14 Ferracute horning.
Nos. 41 & 41A Toledo, horning.
Nos. 13 & 14 Toledo horning.
No. 25½ Consolidated horning.
Nos. 4A, 5A Bliss, horning.
No. 26 Bliss Consolidated 4" str.
No. 75 Bliss Consolidated knee type.
No. 2 Standard screw.
No. 4N V. & O. armature notching.

PRESSES, MISC.

100 ton French Oil Mill hyd.
25 ton Oilgear hydraulic.
30 ton Atlas No. 76 power.
3, 8 & 20 ton General Flexible.
3 & 12 ton Fox Superflex.
Nos. 3, 3¾ & 5 Greenerd.
Nos. 1, 3 & 4 Atlas arbor.
Geier shaft straightening.

RIVETERS

Nos. 1½B, 2A, 3A, 4A, 5A & 7B High Speed, hammer type.
20 ton Allen air.
20 ton Hanna air.

SAWS, METAL

6"x6" Peerless univ. shaping saw.
6"x6" Toledo hack saw.
6"x6" Racine hack saw.
Grabo metal saw table.
13"x13" Racine hack saw.
4", No. 12B Higley cold saw.
7", No. 14 Higley cold saw.

SHAPERS

16" Steptoe.
16" Gould & Eberhardt.
16" Kelly.
16" Walcott.
20" Smith & Mills.
20" Hendey.
20" Ohio.
24" Gould & Eberhardt.
24" Walcott.
24" Columbia.
24" Milwaukee.
24" Cincinnati shaper planer.
28" Ohio.
36" Morton Draw-Cut.

SHEET METAL TOOLS

1¼"x⅛"Bertsch angle roll.
Nos. 1 & 2M Pettingell bumping hammers.
⅜"x3' Shuster wire straightener.
⅜"x7' Shuster wire straightener.
½"x6' Shuster wire straightener.
No. 15 Niagara circle shear.
36" No. 536 Niagara Squaring Shear.
42"x22 ga. Niagara, foot shear.
4'x14 ga. Pexton Squaring Shear.
72"x⅜" Niagara No. 872 gap squaring shear.
10'x⅜" No. 205 Chicago Brake.
No. 1 Gray Sheet Metal Cutter.
No. 2 Campbell Nibbler.

THREADERS

½" Landis 2-spindle, Lanco heads.
½" Webster & Perks double.
½" Acme double head.
¾" & 1½" Geometric.
1", 1½" & 2" Landis double.
1, 2, & 2½" Landis single.
2" & 3" Acme Model A, single.

UPSETTERS

1½", 2", 2½" & 4" Ajax.
1½" Acme.
⅜" Waterbury Farrel SDSS header.
No. 1A Ajax forging rolls.

WELDERS

12 KVA A.E.F. spot.
15 KVA National spot.
17 KVA Thompson Gibb spot.
18 KVA A.E.F. spot, air oper.
20 KVA Agnew spot.
20 KVA Taylor spot.
20 KW Federal spot.
20 KW Taylor Moesta portable.
23 KVA Winfield spot.
50 KVA Detroit spot.
100 KVA Thompson Gibb projec.
150 KVA A.E.F. projection.
25 KW Winfield butt.
35 KW Federal butt.
65 KW Federal butt.
75 KVA Federal butt.
100 KVA Swift butt.

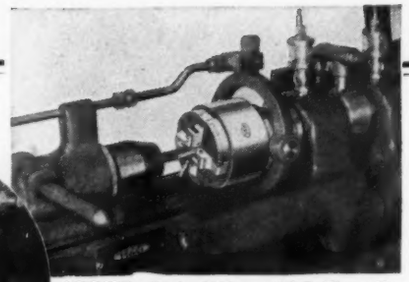
MILES MACHINERY CO.

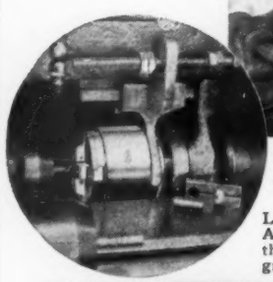
Saginaw, Mich.

Where-to-Buy Directory

FOR YOUR CONVENIENCE IN 1941 BUYING, THIS DIRECTORY LISTS PROMINENT MAKERS OF METAL-WORKING EQUIPMENT, TOOLS, ACCESSORIES, MATERIALS AND SUPPLIES. AN ASTERISK BEFORE THE NAME INDICATES MORE DETAILED INFORMATION IN AN ADVERTISEMENT IN THIS ISSUE.

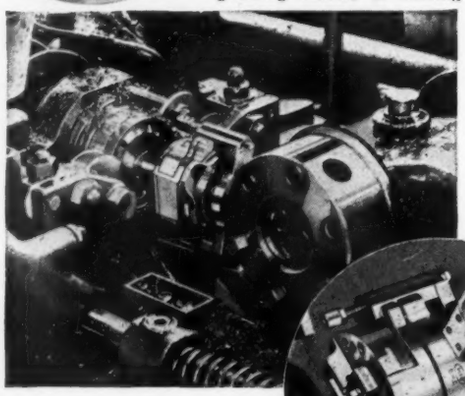
AMERICAN MACHINIST'S 28TH ANNUAL BUYERS REFERENCE NUMBER

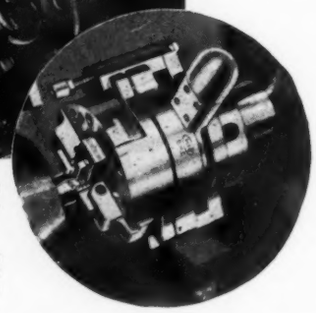




ABOVE—Style MM on H&G Threading Machine. Ideal for any threader as chasers can be changed by inexperienced operators without adjustments.

LEFT — Style MM Rotary on Gridley Automatic. High net production because there's no appreciable down time lost regrinding chasers or making adjustments.





ABOVE—Style DM on Brown & Sharpe Automatic. Production, 1,000 pieces per hour.

RIGHT—Style DMS for Turret Lathes. Note provision for front end trip. Ideal for threading to a shoulder.

H&G

DIE HEADS

Two Types AVAILABLE

H & G INSERT CHASER DIE HEAD

for long runs and hard stocks

New chasers replace dull chasers. Less set-up time. Fewer adjustments. Less down time. Greater net production. More uniform quality of threads. Lower costs. Helps the unskilled operator. Eliminates threading troubles. Simplifies chaser stock.

H & G GENERAL PURPOSE DIE HEAD

for shops having a wide variety of work— low initial investment

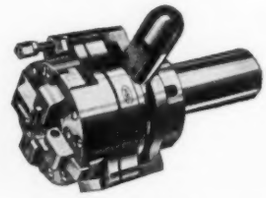
Available for all machines on which threads are cut. Uses Hobbed Chasers, famous for quality of threads, long life of chasers, and all around dependability.

Write for Literature on H&G Die Heads and Threading Machines

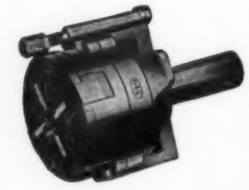
STYLES and SIZES for ALL MACHINES

H & G INSERT CHASER DIE HEADS

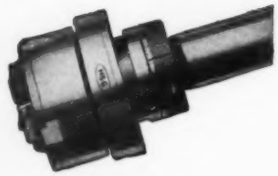
STYLE MM
For rotary spindles.



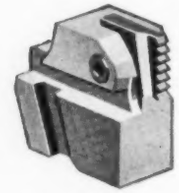
STYLE DMS
A new head for hand turret machines.



STYLE DM
For B & S Automatics and small single spindles.

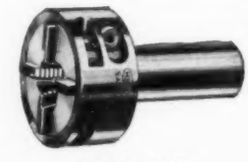


STYLE TM
Receding chasers for superior quality taper threads.



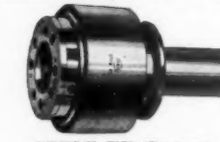
Chasers held in heavy carriers by a single self-locking screw with a powerful draw-in action.

STYLE SAMA
Solid adjustable head with insert chasers for Acorn Die holders.



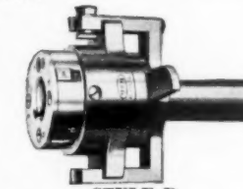
STYLE SAM
Solid adjustable head using insert chasers.

General Purpose Die Heads



STYLE EE (Rotary)
For automatics, threaders, etc., where the die head rotates.

STYLE C
Hand Closing for hand turret machines.



STYLE D
For Brown & Sharpe Automatics and other small machines.

THE EASTERN MACHINE SCREW CORPORATION

Since 1915 Manufacturers of H&G Die Heads and Threading Machines

20-40 BARCLAY STREET, NEW HAVEN, CONN.

WHERE-TO-BUY DIRECTORY

** Indicates further information to be found in advertising pages.*

ABRASIVE GRAIN & STONES (See GRAINS, Abrasive)

ABRASIVE PAPERS & CLOTH (See PAPER & CLOTH, Abrasive)

ALLOYS, Copper
*American Brass Co., Waterbury, Conn.
Ampco Metal Co., Milwaukee, Wis.
Beryllium Copper Corp. of Penna., Reading, Pa.
Bridgeport Brass Co., Bridgeport, Conn.
*Bunting Brass & Bronze Co., Toledo.
Chase Brass & Copper Co., Waterbury, Conn.
*Johnson Bronze Co., New Castle, Pa.
Phelps-Dodge Copper Products Corp., N. Y. C.
Revere Copper & Brass Inc., N. Y. C.
Riverside Metal Co., Riverside, N. J.
Scovill Mfg. Co., Waterbury, Conn.

ALLOYS, Corrosion & Heat Resistant
*Allegheny-Ludlum, Breckenridge, Pa.
*Aluminum Co. of America, Pittsburgh
*American Brass Co., Waterbury, Conn.
American Manganese Steel Div., Chicago Hts., Ill.
Ampco Metal Co., Milwaukee, Wis.
Beryllium Copper Corp. of Penna., Reading, Pa.
*Bethlehem Steel Co., Bethlehem, Pa.
Bridgeport Brass Co., Bridgeport, Conn.
*Bunting Brass & Bronze Co., Toledo, O.
*Caroloy Co., Detroit, Mich.
*Carnegie-Illinois Steel Corp., (Subsidiary U. S. Steel Corp.) Pittsburgh
*Carpenter Steel Co., Reading, Pa.
Chase Brass & Copper Co., Waterbury, Conn.
Colmonoy, Inc., Los Nietos, Cal.
Colonial Alloys Co., Philadelphia, Pa.
Columbia Tool Steel Co., Chicago, Ill.
Crucible Steel Co. of America, N. Y. C.
*Dow Chemical Co., Midland, Mich.
Driver-Harris Co., Harrison, N. J.
Electro-Alloys Co., Elyria, O.
Fansteel Metallurgical Corp., N. Chicago, Ill.
*Firth-Sterling Steel Co., McKeesport, Pa.
General Alloys Co., Boston, Mass.
Haynes-Stellite Co., Kokomo, Ind.
Hoskins Mfg. Co., Detroit, Mich.
International Nickel Co., N. Y. C.
Jessop Steel Co., Washington, Pa.
Latrobe Electric Steel Co., Latrobe, Pa.
*Mallory & Co. Inc., P. R., Indianapolis, Ind.
Michigan Steel Casting Co., Detroit
Phelps-Dodge Copper Products Corp., N. Y. C.
*Pittsburgh Steel Co., Pittsburgh
Republic Steel Corp., Cleveland, O.
Revere Copper & Brass, Inc., N. Y. C.
Riverside Metal Co., Riverside, N. J.
*Ryerson & Son, Inc., Jos. T., Chicago
Scovill Mfg. Co., Waterbury, Conn.
*Timken Steel & Tube Div., Timken Roller Bearing Co., Canton, O.

ALLOYS, Special Iron
*American Brake Shoe & Fdry. Co., New York, N. Y.
*Meehanite Research Institute of America, Pittsburgh

ALLOYS, Steel
*Allegheny-Ludlum Steel Corp., Breckenridge, Pa.
American Manganese Steel Div., Chicago Hgts., Ill.
Anchor Drawn Steel Co., Pittsburgh, Pa.
*Bethlehem Steel Co., Bethlehem, Pa.
Bliss & Laughlin, Inc., Harvey, Ill.
*Carnegie-Illinois Steel Corp., Pittsburgh
*Carpenter Steel Co., Reading, Pa.
Colmonoy, Inc., Los Nietos, Cal.
Colonial Steel Co., Pittsburgh, Pa.
*Columbia Steel Co., (Subsidiary U. S. Steel Corp.) San Francisco, Cal.
Columbia Tool Steel Co., Chicago, Ill.
Copperweld Steel Co., Glassport, Pa.
Crucible Steel Co. of America, N. Y. C.
*Disston & Sons, Inc., Henry, Tacony, Philadelphia, Pa.
Driver-Harris Co., Harrison, N. J.
*Firth-Sterling Steel Co., McKeesport, Pa.
Heppenstall Co., Pittsburgh, Pa.
*Ingersoll Steel & Disc Div., Borg-Warner Corp., Newcastle, Ind.
Jessop Steel Co., Washington, Pa.
Jones & Laughlin Steel Corp., Pittsburgh
Latrobe Electric Steel Co., Latrobe, Pa.
Milne & Co., A., N. Y. C.
Monarch Steel Co., Indianapolis, Ind.
*Pittsburgh Steel Co., Pittsburgh, Pa.
Prosser & Son, Thomas, N. Y. C.
Republic Steel Corp., Cleveland, O.
*Ryerson & Son, Inc., Jos. T., Chicago
*Scully Steel Products Co., N.Y.C.
Stoody Co., Whittier, Cal.
*Timken Steel & Tube Div., Timken Roller Bearing Co., Canton, O.
Union Drawn Steel Co., (Div. of Republic Steel Corp.), Massillon, O.
*United States Steel Corp., Pittsburgh
Universal Steel Co., Bridgeville, Pa.
Vanadium-Alloys Steel Co., Pittsburgh
*Wyckoff Drawn Steel Co., Pittsburgh

ALLOYS, Zinc
National Lead Co., New York, N. Y.
New Jersey Zinc Co., New York, N. Y.

ALUMINUM
*Aluminum Co. of America, Pittsburgh
American Nickeloid Co., Peru, Ill.
Bohn Aluminum & Brass Corp., Detroit
Colonial Alloys Co., Philadelphia

ANODES and CATHODES
*American Brass Co., Waterbury, Conn.
Belmont Smelting & Refining Works, Brooklyn, N. Y.
Bridgeport Brass Co., Bridgeport, Conn.
Chase Brass & Copper Co., Waterbury, Conn.
Hanson Van Winkle-Munning Co., Matawan, N. J.
Republic Lead Equipt. Co., Cleveland, O.
Revere Copper & Brass, Inc., N. Y. C.

ARBORS, Machine
*Brown & Sharpe Mfg. Co., Providence, R. I.
*Butterfield Div. (Union Twist Drill Co.) Derby Line, Vt.
*Cincinnati Milling Mach. Co., Cincinnati, O.
*Cleveland Twist Drill Co., Cleveland, O.
Cochrane-Bly Co., Rochester, N. Y.
Cushman Chuck Co., Hartford, Conn.
*Disston & Sons, Inc., Henry, Tacony, Philadelphia
*Firth Sterling Steel Co., McKeesport, Pa.
*Gisholt Machine Co., Madison, Wis
*Gleason Works, Rochester, N. Y.
Greenfield Tap & Die Corp., Greenfield, Mass.
*Illinois Tool Works, Chicago, Ill.
Ingersoll Milling Machine Co., Rockford, Ill.
*Jacobs Mfg. Co., Hartford, Conn.
*Kearney & Trecker Corp., Milwaukee
Latrobe Electric Steel Co., Latrobe, Pa.
McCrosky Tool Corp., Meadville, Pa.
Morse Tool Co., Detroit, Mich.
Morse Twist Drill & Machine Co., New Bedford, Mass.
National Tool Co., Cleveland, Ohio
*Pratt & Whitney Div., Niles-Bement-Pond Co., Hartford, Conn.
*Scully-Jones & Co., Chicago, Ill.
Standard Tool Co., Cleveland, O.
*Sundstrand Machine Tool Co., Rockford, Ill.
*Universal Engrg. Co., Frankenmuth, Mich.
*Warner & Swasey Co., Cleveland, O.
Westcott Chuck Co., Oneida, N. Y.
Western Tool & Mfg. Co., Springfield, Ohio

ATTACHMENTS, Broaching Machine
Colonial Broach Co., Detroit, Mich.

ATTACHMENTS, Grinding Machine
Abrasive Engineering Corp., Detroit, Mich.
*Abrasive Machine Tool Co., East Providence, R. I.
Abrasive Products, Inc., South Braintree, Mass.
*Brown & Sharpe Mfg. Co., Providence, R. I.
*Cincinnati Grinders, Inc., Cincinnati, O.
Covel Mfg. Co., Benton Harbor, Mich.
Diamond Machine Co., Providence, R. I.
*Fitchburg Grdg. Machine Corp., Fitchburg, Mass.
Industrial Engineering Co., Inc., Minneapolis, Minn.
*Landis Tool Co., Waynesboro, Pa.
*Norton Co., Worcester, Mass.
*Standard Elec. Tool Co., Cincinnati
*Thompson Grinder Co., Springfield, O.

ATTACHMENTS, Lathe
*Ames Co., B. C., Waltham, Mass.
Atlas Press Co., Kalamazoo, Mich.
*Bradford Machine Tool Co., Cincinnati
Chicago Mfg. & Distributing Co., Chicago, Ill.
*Cincinnati Electrical Tool Co., Cincinnati, O.
*Cincinnati Lathe & Tool Co., Oakley, Cincinnati, O.
Clark Jr. Electric Co., Jas., Louisville, Ky.
Colwell, S. G., Providence, R. I.
*Cullman Wheel Co., Chicago
*Dumore Co., Racine, Wis.
*Gisholt Machine Co., Madison, Wis.
*Hardinge Brothers, Inc., Elmira, N. Y.
*Hendey Machine Co., Torrington, Conn.
Hisey-Wolf Machine Co., Cincinnati, O.
*LeBlond Machine Tool Co., R. K., Cincinnati, O.
McCrosky Tool Corp., Meadville, Pa.
McGonegal Mfg. Co., East Rutherford, N. J.
*Monarch Machine Tool Co., Sidney, Ohio
*Pratt & Whitney Div., Niles-Bement-Pond Co., Hartford, Conn.
*Precision Tool Co., Bklyn, N. Y.
Presto Tool Mfg. Co., Detroit, Mich.
*Reed-Prentice Co., Worcester, Mass.
*Rivett Lathe & Grinder Co., Brighton, Boston, Mass.
*Rockford Machine Tool Co., Rockford, Ill.
*South Bend Lathe Works, South Bend, Ind.
*Specialties Mfg. Co., Inc., Bloomfield, N. J.
Speedway Mfg. Co., Cicero, Ill.
*Standard Electric Tool Co., Cincinnati, O.
Stark Tool Co., Waltham, Mass.
Strand Co., N. A., Chicago, Ill.
U. S. Electrical Tool Co., Cincinnati, O.
*Warner & Swasey Co., Cleveland, Ohio

ATTACHMENTS, Milling
Aber Engineering Works, Racine, Wis.
Bridgeport Machines, Inc., Bridgeport, Conn.
*Brown & Sharpe Mfg. Co., Providence, R. I.
*Cincinnati Lathe & Tool Co., Oakley, Cincinnati
*Cincinnati Milling Machine Co., Cincinnati
*Consolidated Machine Tool Corp., Rochester, N. Y. (Newton Div.)
Dalrae Tools Co., Syracuse, N. Y.
*Fray Machine Tool Co., Glendale, Calif.
Hart Machine Co., Dorchester, Mass.
Ingersoll Milling Machine Co., Rockford, Ill.
*Kearney & Trecker Corp., Milwaukee
*Kempsmith Machine Co., New York, N. Y.
*National Machine Tool Co., Cincinnati, O.
Porter-Cable Machine Co., Syracuse, N. Y.
*Pratt & Whitney Div., Niles-Bement-Pond Co., Hartford, Conn.
*Precision Tool Co., Bklyn, N. Y.
*Producto Machine Co., Bridgeport, Conn.
Stark Tool Co., Waltham, Mass.
*Sundstrand Machine Tool Co., Rockford, Ill.
*Van Norman Machine Tool Co., Springfield, Mass.

ATTACHMENTS, Planer
*Cincinnati Planer Co., Oakley, Cincinnati
*Gray Co., G. A., Cincinnati, O.
Ingersoll Milling Machine Co., Rockford, Ill.
*Sellers & Co., Wm., Philadelphia, Pa.

ATTACHMENTS, Screw-Machine
*Brown & Sharpe Mfg. Co., Providence, R. I.
Empire Tool Co., Detroit, Mich.
*Meisel Press Mfg. Co., Boston, Mass.
Morrison Machine Products Div., Elmira, N. Y.

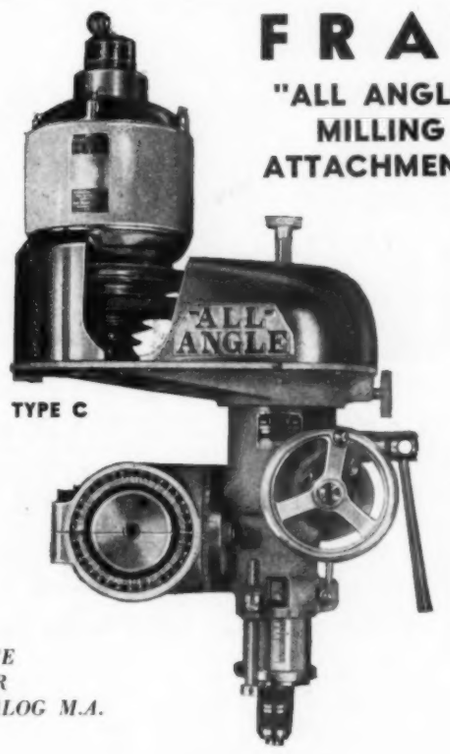
ATTACHMENTS, Tapping
*Errington Mech. Lab., Stapleton, N. Y.
Greenlee Bros. & Co., Rockford, Ill.
Jarvis Co., Chas. L., Middletown, Conn.
*Kingsbury Machine Tool Corp., Keene, N. H.
*Moline Tool Co., Moline, Ill.
*Murchey Machine & Tool Co., Detroit
Nat'l Automatic Tool Co., Richmond, Ind.
Procunier Safety Chuck Co., Chicago

BABBITT (see Metals, Bearing)

BALANCING Machines
Anderson Brothers Mfg. Co., Rockford, Ill.
Chicago Pneumatic Tool Co., N. Y. C.
Commerce Pattern Fdry. & Machine Co., Detroit, Mich.
*Gisholt Machine Co., Madison, Wis.
Globe Tool & Engineering Co., Dayton, O.
*Norton Co., Worcester, Mass.
Olsen Testing Machine Co., Tinius, Philadelphia
*Sundstrand Machine Tool Co., Rockford, Ill.
*Taft-Peirce Mfg. Co., Woonsocket, R. I.
Taylor Mfg. Corp., Milwaukee, Wis.

FRAY

"ALL ANGLE" MILLING ATTACHMENTS



TYPE C

WRITE FOR CATALOG M.A.

FRAY MACHINE TOOL CO.
GLENDALE, CALIF.

WHERE-TO-BUY DIRECTORY

** Indicates further information to be found in advertising pages.*

BALLS, Brass, Bronze & Steel
Abbott Ball Co., Hartford, Conn.
Atlas Ball Co., Philadelphia
Ball & Roller Bearing Co., Danbury, Conn.
*Federal Bearings Co., Poughkeepsie, N. Y.
Hartford Steel Ball Co., Hartford, Conn.
Hoover Steel Ball Co., Ann Arbor, Mich.
New Departure Div., General Motors Corp., Bristol, Conn.
Nice Ball Bearing Co., Philadelphia
*SKF Industries, Inc., Philadelphia, Pa.
*Waterbury Steel Ball Co., Poughkeepsie, N. Y.

BARRELS, Tumbling & Burnishing
Abbott Ball Co., Hartford, Conn.
Atlas Ball Co., Philadelphia
Crown Rheostat & Supply Co., Chicago, Ill.
Hartford Steel Ball Co., Hartford, Conn.
*Waterbury Steel Ball Co., Poughkeepsie, N. Y.

BARS, Boring
*Armstrong Bros. Tool Co., Chicago
*Barber-Colman Co., Rockford, Ill.
*Carboloy Co., Detroit, Mich.
Chicago Tool & Engrg. Co., Chicago
Craley Mfg. Co., C. C., Schillington, Pa.
Davis Boring Tool Co., (Div. Larkin Packer Co.), St. Louis, Mo.
Gairing Tool Co., Detroit, Mich.
*Gisholt Machine Co., Madison, Wis.
Haynes Stellite Co., N. Y. C.
Ingersoll Milling Machine Co., Rockford, Ill.
Kelly Reamer Co., Cleveland, O.
*Lucas Machine Tool Co., Cleveland, O.
McCrosky Tool Corp., Meadville, Pa.
*Michigan Tool Co., Detroit, Mich.
*Natl. Twist Drill & Tool Co., Detroit
*Pratt & Whitney Div., Niles-Bement-Pond Co., Hartford, Conn.
Rickert-Shafer Co., Erie, Pa.
*Scully-Jones & Co., Chicago
*Taft-Peirce Mfg. Co., Woonsocket, R. I.
Universal Boring Machine Co., Hudson, Mass.
*Warner & Swasey Co., Cleveland, O.
Wesson Co., Detroit, Mich.
Westcott Chuck Co., Oneida, N. Y.
Western Tool Mfg. Co., Springfield, O.
*Williams & Co., J. H., Buffalo, N. Y.

BARS & PLATES, Sine
*Brown & Sharpe Mfg. Co., Providence, R. I.
Ford Motor Co., Johansson Div., Dearborn, Mich.
Robbins Engrg. Co., Detroit, Mich.
*Starrett Co., L. S., Athol, Mass.
*Taft-Peirce Mfg. Co., Woonsocket, R. I.
Van Keuren Co., Watertown, Mass.
Vinco Tool Co., Detroit, Mich.

BATHS, Heat Treating & Annealing
Bellis Heat Treating Co., Branford, Conn.
du Pont, E. I., de Nemours & Co., Wilmington, Del.
General Alloys Corp., Boston, Mass.
Holden Co., A. F., New Haven, Conn.
*Houghton, E. F. & Co., Philadelphia

BATTERIES, Storage, Industrial Truck & Locomotive
Edison Storage Battery Co., Orange, N. J.
Electric Storage Battery Co., Philadelphia
Gould Storage Battery Corp., Depew, N. Y.
K. W. Battery Co., Chicago
Philco (Battery Div.), Philadelphia
Prest-O-Lite Battery Co., Indianapolis
U. S. L. Battery Corp., Niagara Falls, N. Y.

BEADING MACHINES
Bliss Co., E. W., Brooklyn, N. Y.
Callahan Can Machine Co., Inc., Brooklyn, N. Y.
Cameron Can Machinery Co., Chicago, Ill.
Continental Can Co., Inc., (Machine Div.) New York, N. Y.
Ingels Elbow Machine Corp., Chicago, Ill.
Kane & Roach, Inc., Syracuse, N. Y.
Knowlton Co., M. D., Rochester, N. Y.
McKinney Tool & Mfg. Co., Cleveland, Ohio.
*Niagara Machine & Tool Works, Buffalo, N. Y.
Peck, Stow & Wilcox Co., Southington, Conn.
Quickwork-Whiting Div., Whiting Corp., Harvey, Ill.
Rafter Machine Co., Belleville, N. J.
S. & S. Machine Works, Chicago, Ill.
*Schatz Mfg. Co., Poughkeepsie, N. Y.
Slayman & Co., Baltimore, Md.
Stecher Co., Charles, Chicago, Ill.
Swaine Mfg. Co., Fred J., St. Louis, Mo.

BEARINGS & BUSHINGS
Allan & Son, A., Harrison, N. J.
*Aluminum Co. of America, Pittsburgh
Ampco Metal Co., Milwaukee, Wis.
Bohn Aluminum & Brass Corp., Detroit
Boston Gear Works, Inc., N. Quincy, Mass.
*Bunting Brass & Bronze Co., Toledo
*Carlyle Johnson Machine Co., Manchester, Conn.
Dodge Mfg. Corp., Mishawaka, Ind.
Federal-Mogul Corp., Detroit, Mich.
*Johnson Bronze Co., New Castle, Pa.
Link-Belt Co., Chicago
McGill Mfg. Co., Valparaiso, Ind.
Moceasin Bushing Co., Chattanooga, Tenn.
Taylor Machine Co., Cleveland, O.

BEARINGS, Ball
Aetna Ball Bearing Mfg. Co., Chicago
Ahlberg Bearing Co., Chicago
Ball & Roller Bearing Corp., Danbury, Conn.
Bantam Bearings Corp., So. Bend, Ind.
*Bearings Co. of America, Lancaster, Pa.
Boston Gear Works, Inc., Quincy, Mass.
Consolidated Bearing Co., E. Orange, N. J.
Fafnir Bearing Co., New Britain, Conn.
*Federal Bearings Co., Poughkeepsie, N. Y.
Federal-Mogul Corp., Detroit, Mich.
*Gwilliam Co., Brooklyn, N. Y.
Hoover Ball & Bearing Co., Ann Arbor, Mich.
Link-Belt Co., Chicago
*Marlin-Rockwell Corp., Jamestown, N. Y.
McGill Mfg. Co., Valparaiso, Ind.
New Departure Div., General Motors Corp., Bristol, Conn.
Nice Ball Bearing Co., Philadelphia, Pa.
*Norma-Hoffman Bearings Corp., Stamford, Conn.
*S. K. F. Industries, Inc., Philadelphia
*Schatz Mfg. Co., Poughkeepsie, N. Y.
Shafer Bearing Corp., Chicago
Split Ballbearing Corp., Lebanon, N. H.
Stephens-Adamson Co., Aurora, Ill.
*Torrington Co., Torrington, Conn.

BEARINGS, Needle & Quill
Bantam Bearings Corp., So. Bend, Ind.
Dodge Mfg. Corp., Mishawaka, Ind.
*Federal Bearings Co., Inc., Poughkeepsie, N. Y.
McGill Mfg. Co., Valparaiso, Ind.
*Norma-Hoffmann Bearings Corp., Stamford, Conn.
Orange Roller Bearing Co., Orange, N. J
Roller Bearing Co. of America, Trenton, N. J.
*S. K. F. Industries, Inc., Philadelphia, Pa.
*Torrington Co., Torrington, Conn.

BEARINGS, Non-Metallic
*Bakelite Corp., N. Y. C.
Continental-Diamond Fibre Co., Newark, Del.
Formica Insulation Co., Cincinnati, O.
Richardson Co., Lockland, Cincinnati, O.
Spaulding Fibre Co., Tonawanda, N. Y.
Synthane Corp., Oaks, Pa.

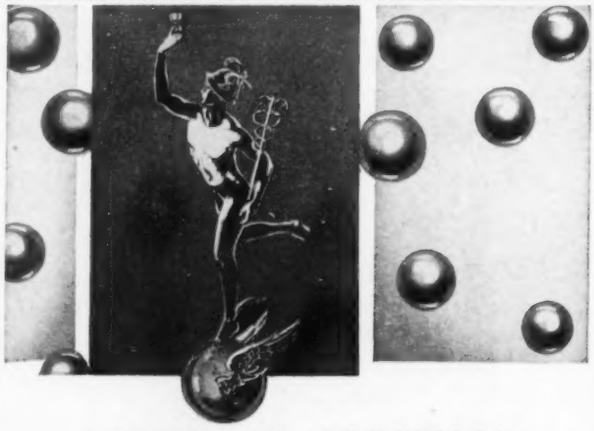
BEARINGS, Oilless & Graphite
Amplex Div., Chrysler Corp., Detroit
Boston Gear Works, Inc., N. Quincy, Mass.
Bound Brook Oilless Bearing Co., Bound Brook, N. J.
*Bunting Brass & Bronze Co., Toledo, O.
*Carlyle Johnson Machine Co., Manchester, Conn.
Continental-Diamond Fibre Co., Newark, Del.
Formica Insulation Co., Cincinnati, O.
*Johnson Bronze Co., New Castle, Pa.
Manhattan Rubber Mfg. Div., Passaic, N. J.
Moraine Products Div., General Motors Corp., Dayton, O.
Randall-Graphite Products Co., Chicago

BEARINGS, Roller
Ball & Roller Bearing Co., Danbury, Conn.
Bantam Bearings Corp., South Bend, Ind.
*Bower Roller Bearing Co., Detroit, Mich.
Consolidated Bearings Co., E. Orange, N. J.
Fafnir Bearing Co., New Britain, Conn.
*Gwilliam Co., Brooklyn, N. Y.
Heim Co., Fairfield, Conn.
Hoover Ball & Bearing Co., Ann Arbor, Mich.
Hyatt Bearings Div., General Motors Corp., Harrison, N. J.
Link-Belt Co., Chicago
McGill Mfg. Co., Valparaiso, Ind.
*Norma-Hoffmann Bearings Corp., Stamford, Conn.
Orange Roller Bearing Co., Orange, N. J.
Roller Bearing Co. of America, Trenton, N. J.
Shafer Bearing Corp., Chicago
*S. K. F. Industries, Inc., Philadelphia
Split Ballbearing Corp., Lebanon, N. H.
*Timken Roller Bearing Co., Canton, O.

BEARINGS, Thrust
(See preceding classifications)

BELLOWS, Seamless Metal
Bridgeport Thermostat Co., Bridgeport, Conn.
Clifford Mfg. Co., Boston, Mass.
Chicago Metal Hose Corp., Maywood, Ill.
Fulton Sylphon Co., Knoxville, Tenn.
Trane Co., La Crosse, Wis.

BELTING, Leather
Alexander Bros., Philadelphia, Pa.
Bond Co., Chas., Philadelphia, Pa.
Chicago Rawhide Mfg. Co., Chicago
Graton & Knight Co., Worcester, Mass.
*Greene, Tweed & Co., N. Y. C.
*Houghton & Co., E. F., Philadelphia
National Leather Belting Co., N. Y. C.
Rhoads & Sons, J. E., Philadelphia, Pa.
Warren Belting Co., Worcester, Mass.



ACCURACY—PRECISION

All WATERBURY STEEL BALLS are of uniform hardness which extends to the center of each ball. Made of high carbon chrome alloy steel highly finished.

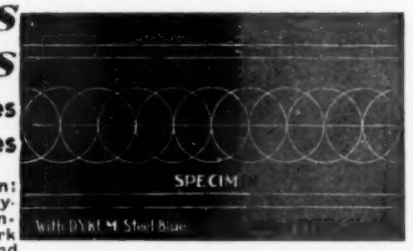
WATERBURY STEEL BALLS

HIGH CARBON, CHROME ALLOY STEEL, BRONZE, MONEL METAL, STAINLESS STEEL BALLS, STANDARD OR SPECIAL SIZES. WRITE FOR COMPLETE INFORMATION.

THE WATERBURY STEEL BALL CO., INC.
Poughkeepsie, New York
Factory: Waterbury, Conn.

DYKEM STEEL BLUE

STOPS LOSSES
making dies & templates



Simply brush on: ready for the layout in a few minutes. The dark blue background makes the layout lines show up in sharp relief, and at the same time prevents metal glare. Increases efficiency and accuracy.

Write for full information.

THE DYKEM COMPANY, 2301 N. 11th St., St. Louis, Mo.
(In Canada: 3194 Dundas Street West, Toronto, Ont.)

WHERE-TO-BUY DIRECTORY

** Indicates further information to be found in advertising pages.*

BELTING, Metal Conveyor
Acme Steel Co., Chicago, Ill.
Cambridge Wire Cloth Co., Cambridge, Md.
Link-Belt Co., Indianapolis, Ind.
Sandvik Steel, Inc., N. Y. C.
Wickwire Spencer Steel Co., N. Y. C.

BELTING, Rubber & Fabric
Boston Woven Hose & Rubber Co., Cambridge, Mass.
Continental Rubber Works, Erie, Pa.
Dayton Rubber Mfg. Co., Dayton, Ohio
du Pont, E. I., de Nemours & Co., Wilmington, Del.
Gates Rubber Co., Denver, Colo.
Gilmer Co., L. H., Tacony, Philadelphia
Goodrich Co., B. F., Akron, O.
Goodyear Tire & Rubber Co., Akron, O.
Graton & Knight Co., Worcester, Mass.
Manhattan Rubber Mfg. Div., Passaic, N. J.
Manheim Mfg. & Belting Co., Manheim, Pa.
New York Belting & Packing Co., Passaic, N. J.
Republic Rubber Co., Youngstown, O.
Thermoid Rubber Div., Thermoid Co., Trenton, N. J.
U. S. Rubber Products, Inc., N. Y. C.

BELTS & BANDS, Abrasive
Armour Sand Paper Works, Chicago
Behr-Manning Corp., Troy, N. Y.
Carborundum Co., Niagara Falls, N. Y.
*Clover Mfg. Co., Norwalk, Conn.
*Dumore Co., Racine, Wis.
Mid-West Abrasive Co., Detroit, Mich.
Minnesota Mining & Mfg. Co., St. Paul, Minn.
*Norton Company, Worces' Mass.
*Pratt & Whitney Div., Niles-Bement-Pond Co., Hartford, Conn.
Production Machine Co., Greenfield, Mass.
Walls Sales Corp., N. Y. C.

BELTS, "V"
*Allis-Chalmers Mfg. Co., Milwaukee
Chicago Belting Co., Chicago.
Continental Rubber Works, Erie, Pa.
Dayton Rubber Mfg. Co., Dayton, O.
Dodge Mfg. Corp., Mishawaka, Ind.
du Pont de Nemours & Co., E. I., Wilmington, Del.
Firestone Tire & Rubber Co., Dayton, O.
Gates Rubber Co., Denver, Col.
Gilmer Co., L. H., Tacony, Philadelphia, Pa.
Goodrich Co., B. F., Akron, O.
Goodyear Tire & Rubber Co., Akron, O.
Manhattan Rubber Mfg. Div., Passaic, N. J.
Medart Co., St. Louis, Mo.
Miller & Co., Carl A., N. Y. C.
New York Belting & Packing Co., Passaic, N. J.
Republic Rubber Co., Youngstown, O.
Rhoads & Sons, J. E., Philadelphia
Thermoid Rubber Div., Thermoid Co., Trenton, N. J.
U. S. Rubber Products, Inc., N. Y. C.
Wood's Sons Co., T. B., Chambersburg, Pa.
Worthington Pump & Machry. Corp., Harrison, N. J.

BENCHES, Shop
Aurora Equipt. Co., Aurora, Ill.
*Raumbach Mfg. Co., E. A., Chicago.
Roice Crane Co., Toledo, O.
Challenge Machy. Co., Grand Haven, Mich.
*Delta Mfg. Co., Milwaukee, Wis.
*Hardinge Brothers, Inc., Elmira, N. Y.
*Hill Acme Co., Cleveland
Lyon Metal Products, Inc., Aurora, Ill.
*New Britain-Gridley Mach. Div., New Britain, Conn.
Pollard Bros. Mfg. Co., Chicago.
*Rivett Lathe & Grinders, Inc., Brighton, Boston, Mass.
*Standard Pressed Steel Co., Jenkintown, Pa.
Walker-Turner Co., Plainfield, N. J.
Western Tool & Mfg. Co., Springfield, O.
Whitney Metal Tool Co., Rockford, Ill.

BENDING & STRAIGHTENING Machines
*Ajax Mfg. Co., Cleveland, O.
American Foundry Equipment Co., Mishawaka, Ind.
*Baldwin-Southwark Corp., Paschall, Philadelphia, Pa.
Bath & Co., Cyril, Cleveland.
Bertsch & Co., Cambridge City, Ind.
Birdsboro Steel Fdry. & Machy. Co., Birdsboro, Pa.
Blackhawk Mfg. Co., Milwaukee, Wis.
Bliss Co., E. W., Brooklyn, N. Y.
*Buffalo Forge Co., Buffalo, N. Y.
Champion Blower & Forge Co., Lancaster, Pa.
*Cincinnati Shaper Co., Hopple, Cincinnati, O.
*Cleveland Punch & Shear Works, Cleveland, O.
*Consolidated Machine Tool Corp., Rochester, N. Y.
Continental Roll & Steel Fdry. Co., E. Chicago, Ind.
Elmes Engineering Works, Chas. F., Chicago.
*Farrel-Birmingham Co., Inc., Ansonia, Conn.
General Mfg. Co., Detroit, Mich.
Hannifin Mfg. Co., Chicago
Hendley & Whittemore Co., Beloit, Wis.
Hydraulic Press Mfg. Co., Mt. Gilead, O.
Lake Erie Engrg. Corp., Kenmore, Buffalo, N. Y.
Logansport Machine, Inc., Logansport, Ind.
Long & Allstatter Div. of Columbia Machine Tool Co., Hamilton, O.
Medart Co., St. Louis, Mo.
*Niagara Machine & Tool Works, Buffalo, N. Y.
Parker Appliance Co., Cleveland, O.
Pels & Co., Inc., Henry, N. Y. C.
*Ryerson & Son, Inc., Jos. T., Chicago, Ill.
*Schatz Mfg. Co., Poughkeepsie, N. Y.
*Springfield Machine Tool Co., Springfield, O.
Thomas Machine Mfg. Co., Pittsburgh
United Engrg. & Foundry Co., Pittsburgh.
U. S. Tool Co., Ampere, N. J.
Waterbury Farrel Foundry & Machine Co., Waterbury, Conn.
*Watson-Stillman Co., Roselle, N. J.
Wickes Bros., Saginaw, Mich.
Williams, White & Co., Moline, Ill.
Wood Co., R. D., Philadelphia, Pa.

BINS, Tool & Parts (See LOCKERS & SHELVING)

BITS, Tool
*Allegheny Ludlum Steel Corp., Pittsburgh, Pa.
American Cutting Alloys, Inc., N. Y. C.
Anchor Drawn Steel Co., Pittsburgh, Pa
Apex Machine & Tool Co., Dayton, O.
*Armstrong Bros. Tool Co., Chicago.
*Barber-Colman Co., Rockford, Ill.
*Bethlehem Steel Co., Bethlehem, Pa.
Carboloy Co., Detroit, Mich.
*Carpenter Steel Co., Reading, Pa.
*Cleveland Twist Drill Co., Cleveland, O.
Colonial Broach Co., Detroit, Mich.
Colonial Steel Co., Pittsburgh, Pa.
Columbia Tool Steel Co., Chicago.
*Crafts Co., Inc., Arthur A., Boston
Crescent Tool Co., Jamestown, N. Y.
Crucible Steel Co. of America, N. Y. C.
*Disston & Sons, Inc., Henry, Tacony, Philadelphia,
Fansteel Metallurgical Corp., Chicago
*Firth-Sterling Steel Co., McKeesport, Pa.
Gairing Tool Co., Detroit, Mich.
*Gisholt Machine Co., Madison, Wis.
Gorham Tool Co., Detroit, Mich.
Haynes Stellite Co., Kokomo, Ind.
*Illinois Tool Works, Chicago.
Ingersoll Milling Machine Co., Rockford, Ill.
Jessop Steel Co., Washington, Pa.
Kelly Reamer Co., Cleveland.
Latrobe Electric Steel Co., Latrobe, Pa.
McCrosky Tool Corp., Meadville, Pa.
McKenna Metals Co., Latrobe, Pa.
*Michigan Tool Co., Detroit, Mich.
Morse Twist Drill & Mach. Co., New Bedford, Mass.
*National Broach & Machine Co., Detroit
National Tool Co., Cleveland, O.
*Natl. Twist Drill & Tool Co., Detroit, Mich.
*O. K. Tool Co., Shelton, Conn.
*Pratt & Whitney Div., Niles-Bement-Pond Co., Hartford, Conn.
Production Tool Co., Detroit, Mich.
*Producto Machine Co., Bridgeport, Conn.
Prosser & Son, Thos., New York, N. Y.
*Ready Tool Co., Bridgeport, Conn.
*Scully-Jones & Co., Chicago
Simonds Saw & Steel Co., Fitchburg, Mass.
Stoody Co., Whittier, Cal.
Super Tool Company, Detroit, Mich.
*Union Twist Drill Co., Athol, Mass.
Universal Steel Co., Bridgeville, Pa.
Vanadium Alloys Steel Co., Pittsburgh
*Vascaloy-Ramet Corp., N. Chicago, Ill.
Vincent Steel Process Co., Detroit
*Warner & Swasey Co., Cleveland, O.
Wesson Co., Detroit, Mich.
*Williams, J. H. & Co., N. Y. C.

BLADES, Circular-Saw (See SAW BLADES, Circular)

BLADES, Cutter, Milling, Boring & Reaming (see BITS, Tool)

BLADES, Hack- & Band-Saw
American Saw & Mfg. Co., Springfield, Mass.
*Armstrong-Blum Mfg. Co., Chicago.
*Atkins & Co., E. C., Indianapolis, Ind.
Barnes, W. O., Co., Inc., Detroit, Mich.
Clemson Bros., Inc., Middletown, N. Y.
*Continental Machines, Inc., Minneapolis, Minn.
*Disston & Sons, Inc., Henry, Tacony, Philadelphia.
*Grobet File Corp. of America, N. Y. C.
Laidlaw, Inc., Wm., Belmont, N. Y.
Millers Falls Co., Greenfield, Mass.
*Racine Tool & Mach. Co., Racine, Wis.
Simonds Saw & Steel Co., Fitchburg, Mass.
*Starrett Co., L. S., Athol, Mass.
*Thompson & Sons Co., Henry G., New Haven, Conn.
Victor Saw Works, Middletown, N. Y.

BLOCKS, Pillow
Ahlberg Bearing Co., Chicago, Ill.
*Allis-Chalmers Mfg. Co., Milwaukee
Bartlett & Snow Co., C. O., Cleveland
Boston Gear Works, Inc., N. Quincy, Mass.
Chain Belt Co., Milwaukee, Wis.
Dodge Mfg. Corp., Mishawaka, Ind.
*Earle Gear & Machinery Co., Philadelphia.
Fafnir Bearing Co., New Britain, Conn.
*Farrel-Birmingham Co., Ansonia, Conn.
Hanson Clutch & Machy. Co., Tiffin, O.
*Hill Acme Co., Cleveland, O.
Jeffrey Mfg. Co., Columbus, O.
Link-Belt Co., Chicago.
*Marlin Rockwell Corp., Jamestown, N. Y.
Medart Co., St. Louis, Mo.
*Norma-Hoffman Bearings Corp., Stamford, Conn.
Palmer-Bee Co., Detroit, Mich.
Randall Graphite Prod. Corp., Chicago.
Royersford Fdry. & Machry. Co., Royersford, Pa.
*S. K. F. Industries, Inc., Philadelphia
Shafer Bearing Corp., Chicago.
*Standard Pressed Steel Co., Jenkintown, Pa.
Stephens-Adamson Mfg. Co., Aurora, Ill.

BLOCKS, Precision Gage
*Brown & Sharpe Mfg. Co., Providence, R. I.
Dearborn Gage Co., Dearborn, Mich.
Ford Motor Co., Johansson Div., Dearborn, Mich.
*Lufkin Rule Co., Saginaw, Mich.
*Pratt & Whitney Div., Niles-Bement-Pond Co., Hartford, Conn.
Scherr Co., Inc., Geo., N. Y. C.
Standard Gage Co., Poughkeepsie, N. Y.
*Starrett Co., L. S., Athol, Mass.
*Taft-Peirce Mfg. Co., Woonsocket, R. I.
Van Keuren Co., Watertown, Mass.

BLOCKS, "V"
*Brown & Sharpe Mfg. Co., Providence, R. I.
*Graham Mfg. Co., Providence, R. I.
Greenfield Tap & Die Corp., Greenfield, Mass.
Lufkin Rule Co., Saginaw, Mich.
*Pratt & Whitney Div., Niles-Bement-Pond Co., Hartford, Conn.
*Sheffield Gage Corp., Dayton, O.
*Starrett Co., L. S., Athol, Mass.
*Taft-Peirce Mfg. Co., Woonsocket, R. I.

BLOWERS, Electric Hand
*Buffalo Forge Co., Buffalo, N. Y.
Champion Blower & Forge Co., Lancaster, Pa.
Clements Mfg. Co., Chicago.
Electric Blower Co., Boston, Mass.
Ideal Commutator Dresser Co., Sycamore, Ill.
Independent Pneumatic Tool Co., Chicago.
Skilsaw, Inc., Chicago.
Speedway Mfg. Co., Cicero, Ill.
*Standard Electrical Tool Co., Cincinnati, Ohio
Sturtevant, B. F., Hyde Park, Boston
U. S. Electrical Tool Co., Cincinnati, O.

BLOWERS
*Allis-Chalmers Mfg. Co., Milwaukee, Wis.
*American Gas Furnace Co., Elizabeth, N. J.
Bendix Products Corp., So. Bend, Ind.
Binks Mfg. Co., Chicago
*Buffalo Forge Co., Buffalo, N. Y.
Champion Blower & Forge Co., Lancaster, Pa.
Chelsea Fan & Blower Co., N. Y. C.
Clements Mfg. Co., Chicago
DeLaval Steam Turbine Co., Trenton, N. J.
DeVilbiss Company, Toledo, O.
Diehl Mfg. Co., Elizabethport, N. J.
Eclipse Fuel Engrg. Co., Rockford, Ill.
Emerson Electric Mfg. Co., St. Louis
General Electric Co., Schenectady, N. Y.
Ingersoll-Rand Co., N. Y. C.
*Janette Mfg. Co., Chicago
Niagara Blower Co., Buffalo, N. Y.
North American Mfg. Co., Cleveland, O.
Pangborn Corp., Hagerstown, Md.
Peerless Electric Co., Racine, Wis.
Signal Electric Mfg. Co., Menominee, Mich.
So. Bend Air Prods., Inc., So. Bend, Ind.
Spencer Turbine Co., Hartford, Conn.
*Standard Electrical Tool Co., Cincinnati, O.
*Strong, Carlisle & Hammond Co., Cleveland, O.
Sturtevant Co., B. F., Hyde Park, Boston, Mass.
Wagner Electric Corp., St. Louis, Mo.
Wing Mfg. Co., L. J., N. Y. C.

BLUING, Layout
*Dayton Rogers Mfg. Co., Minneapolis, Minn.
*Dykem Co., St. Louis, Mo.

BOARDS, Drawing (See DRAFTING-ROOM SUPPLIES).

BOLT & NUT MACHINES
*Ajax Mfg. Co., Euclid, Cleveland, O.
Beaver Pipe Tools, Inc., Warren, O.

GWILLIAM Roller Thrust Bearings

TYPE RT ROLLER THRUST BEARINGS

- Made with flat seats and in a variety of self-aligning types.

These bearings are especially adapted for *heavy loads* at slow or moderate speeds.

Standard sizes are shown in our general catalog, sent upon request.

THE GWILLIAM COMPANY
361 FURMAN ST. BROOKLYN, N. Y.

WHERE-TO-BUY DIRECTORY

** Indicates further information to be found in advertising pages.*

BOLT & NUT MACHINES (Cont.)
Bliss Co., E. W., Brooklyn, N. Y.
Champion Blower & Forge Co., Lancaster, Pa.
*Cleveland Automatic Machinery Co., Cleveland, O.
*Cone Automatic Mach. Co., Windsor, Vt.
*Consolidated Machine Tool Corp., Rochester, N. Y.
Davenport Machine Tool Co., Rochester, N. Y.
*Eastern Machine Screw Corp., New Haven, Conn.
Federal Press Co., Elkhart, Ind.
Foote-Burt Co., Cleveland, O.
*Geometric Tool Co., New Haven, Conn.
*Goss & deLeeuw Machine Co., New Britain, Conn.
*Grant Mfg. & Machine Co., Bridgeport, Conn.
Greenfield Tap & Die Corp., Greenfield, Mass.
*Hendey Machine Co., Torrington, Conn.
*Hill Acme Co., Cleveland, O.
*Landis Machine Co., Waynesboro, Pa.
Merrell Mfg. Co., Toledo, O.
*Murchey Machine & Tool Co., Detroit
*National Acme Co., Cleveland, O.
National Machinery Co., Tiffin, O.
*New Britain-Gridley Machine Div., New Britain, Conn.
*Oster Mfg. Co., Cleveland, O.
Pipe Machinery Co., Cleveland, O.
*Pratt & Whitney Div. Niles-Bement-Pond Co., Hartford, Conn.
Rickert-Shafer Co., Erie, Pa.
Scherr Co., Geo., N. Y. C.
*Taft-Peirce Mfg. Co., Woonsocket, R. I.
Toledo Pipe Threading Machine Co., Toledo, O.
*V. & O. Press Co., Hudson, N. Y.
Waterbury Farrel Foundry & Machine Co., Waterbury, Conn.

BOLTS, Eye
*American Chain & Cable Co., Bridgeport, Conn.
*Armstrong Bros. Tool Co., Chicago
*Bethlehem Steel Co., Bethlehem, Pa.
Billings & Spencer Co., Hartford, Conn.
*Lamson & Sessions Co., Cleveland, O.
National Screw & Mfg. Co., Cleveland, O.
Oliver Iron & Steel Corp., Pittsburgh
Republic Steel Corp., Cleveland, O.
*Williams & Co., J. H., Buffalo, N. Y.

BOLTS & NUTS
Acme Machine Products Co., Muncie, Ind.
Atlas Bolt & Screw Co., Cleveland, O.
Bayonne Bolt Corp., Bayonne, N. J.
*Bethlehem Steel Co., Bethlehem, Pa.
Boots Aircraft Nut Corp., Waterbury, Conn.
Chase Brass & Copper Co., Waterbury, Conn.
Cleveland Cap Screw Co., Cleveland, O.
Dardelet Threadlock Corp., N. Y. C.
Eclipse Stop-Nut Corp., Elizabeth, N. J.
*Lamson & Sessions Co., Cleveland, O.
Ohio Nut & Bolt Co., Berea, O.
Parker-Kalon Corp., N. Y. C.
Pawtucket Mfg. Co., Pawtucket, R. I.
Pittsburgh Screw & Bolt Corp., Pittsburgh
Rawlplug Co., N. Y. C.
Republic Steel Corp., Cleveland, O.
Russell, Burdsall & Ward Bolt & Nut Co., Port Chester, N. Y.
*Standard Pressed Steel Co., Jenkintown, Pa.
Tinnerman Products Co., Cleveland
*Williams & Co., Inc., J. H., Buffalo, N. Y.

BORING, DRILLING & MILLING Machines, Horizontal
*Barnes Co., W. F. & John, Rockford, Ill.
*Bryant Machinery & Engrg. Co., Chicago
Buhr Machine Tool Co., Ann Arbor, Mich.
*Cincinnati-Gilbert Machine Tool Co., Cincinnati
*Consolidated Machine Tool Corp., Rochester, N. Y.
Cosa Oversea Trading Corp., New York, N. Y.
Defiance Machine Works, Defiance, Ohio
Foote-Burt Co., Cleveland, O.
*General Machry. Corp. (Niles Tool Wks. Div.), Hamilton, O.
*Giddings & Lewis Machine Tool Co., Fond du Lac, Wis.
Greenlee Bros. & Co., Rockford, Ill.
Ingersoll Milling Machine Co., Rockford, Ill.
*Lucas Machine Tool Co., Cleveland, O.
Mesta Machine Co., Pittsburgh, Pa.
*Moline Tool Co., Moline, Ill.
Morton Mfg. Co., Muskegon Hgts., Mich.
*National Acme Co., Cleveland, O.
Natl. Automatic Tool Co., Richmond, Ind.
*Niles Tool Works Co., Hamilton, O.
*Ohio Machine Tool Co., Kenton, O.
Rockford Drilling Machine Div., Borg-Warner Corp., Rockford, Ill.
*Sellers & Co., Inc., Wm., Philadelphia
*Snyder Tool & Engrg. Co., Detroit
*Springfield Machine Tool Co., Springfield, O.
Universal Boring Machine Co., Hudson, Mass.

BORING MACHINES, Jig (See JIG-BORING MACHINES)

BORING MACHINES, Precision
Atlas Press Co., Kalamazoo, Mich.
*Barnes Co., W. F. & John, Rockford, Il.
*Bryant Machinery & Engrg. Co., Chicago
Cimatool Co., Dayton, O.
Cochrane-Bly Co., Rochester, N. Y.
Defiance Machine Works, Defiance, O.
*Ex-Cell-O Corp., Detroit, Mich.
*Giddings & Lewis Mach. Tool Co., Fond du Lac, Wis.
*Heald Machine Co., Worcester, Mass.
*Leland-Gifford Co., Worcester, Mass.
*Lucas Machine Tool Co., Cleveland, O.
*Moline Tool Co., Moline, Ill.
Natl. Automatic Tool Co., Richmond, Ind.
*Pratt & Whitney Div. Niles-Bement-Pond Co., Hartford, Conn.
*Rivett Lathe & Grinder, Inc., Brighton, Boston, Mass.
Rockford Drilling Machine Co., Rockford, Ill.
Stamets, Wm. K., Pittsburgh, Pa.
Stokerunit Corp., Milwaukee, Wis.
Universal Boring Machine Co., Hudson, Mass.

BORING MILLS, Vertical
*Bullard Co., Bridgeport, Conn.
*Cincinnati Planer Co., Oakley, Cinn.
*Consolidated Machine Tool Corp., Rochester, N. Y.
*General Machinery Corp. (Niles Tool Works Div.), Hamilton, O.
*King Machine Tool Co., Cincinnati, O.
*Sellers & Co., Inc., Wm., Philadelphia
*Springfield Machine Tool Co., Springfield, Ohio

BOXES, Heat-Treating & Annealing
American Manganese Steel Div., Chicago Hgts., Ill.
Driver-Harris Co., Harrison, N. J.
Electro-Alloys Co., Elyria, O.
National-Erie Corp., Erie, Pa.
General Alloys Co., Boston, Mass.
Seamless Products Co., N. Y. C.
Strong, Carlisle & Hammond Co., Cleveland, O.

BOXES, Tool (See CHESTS, Tool)

BOXES, Tote
All-Steel Equip., Aurora, Ill.
*Barrett-Cravens Co., Chicago, Ill.
Berger Mfg. Div., Republic Steel Corp., Canton, O.
Continental-Diamond Fibre Co., Bridgeport, Pa.
Lucas & Son, Inc., J. L., Bridgeport, Conn.
Lyon Metal Products Co., Aurora, Ill.
Pollard Bros. Mfg. Co., Chicago
Powell Pressed Steel Co., Hubbard, O.
Seamless Prod. Co., Inc., N. Y. C.
Service Caster & Truck Co., Albion, Mich.
Stackbin Corp., Providence, R. I.
*Standard Pressed Steel Co., Jenkintown, Pa.
Truscon Steel Corp., Youngstown, O.

BRAKES, Bending, Press
Bliss Co., E. W., Brooklyn, N. Y.
*Bryant Machinery & Engrg. Co., Chicago
*Cincinnati Shaper Co., Cincinnati, O.
Cleveland Crane & Engrg. Co., Wickliffe, O.
*Cleveland Punch & Shear Works Co., Cleveland, O.
Columbia Machine Tool Co., Hamilton, O.
Dreis & Krump Mfg. Co., Chicago
Henderson Machine Co., Philadelphia
Quickwork-Whiting Corp., Harvey, Ill.
United Engrg. & Foundry Co., Pittsburgh, Pa.
Verson Allsteel Press Co., Chicago
Whitney Metal Tool Co., Rockford, Ill.

BRAKES, Electric
Cutler-Hammer, Inc., Milwaukee, Wis.
Dings Magnetic Separator Co., Milwaukee
Electric Controller & Mfg. Co., Cleveland, O.
General Electric Co., Schenectady, N. Y.
Stearns Magnetic Mfg. Co., Milwaukee
*Westinghouse Electric & Mfg. Co., E. Pittsburgh

BRICK, Furnace (See REFRACTORIES)

BROACHES
*American Broach & Machine Co., (Div. Sundstrand Machine Tool Co.), Ann Arbor, Mich.
Apex Broach Co., Detroit, Mich.
*Butterfield & Co., Div., Union Twist Drill Co., Derby Line, Vt.
Colonial Broach & Mach. Co., Detroit
Connecticut Broach & Machine Co., New London, Conn.
Detroit Tap & Tool Co., Detroit, Mich.
*Ex-Cell-O Corp., Detroit, Mich.
*Gammons, Holman Co., Manchester, Conn.
Haynes Stellite Co., Kokomo, Ind.
*Illinois Tool Works, Chicago, Ill.
*Lapointe Machine Tool Co., Hudson, Mass.
*Michigan Tool Co., Detroit, Mich.
*National Broach & Mach. Co., Detroit
National Tool Co., Cleveland, O.
*Oilgear Co., Milwaukee, Wis.
*Union Twist Drill Co., Athol, Mass.

BROACHING MACHINES
*American Broach & Machine Co., (Div. Sundstrand Machine Tool Co.), Ann Arbor, Mich.
*Cincinnati Milling Machine Co., Cincinnati, O.
Colonial Broach & Machine Co., Detroit
*Consolidated Machine Tool Corp., Rochester, N. Y.
Elmes Engrg. Works, Chas. F., Chicago
Foote-Burt Co., Cleveland, O.
*General Machry. Corp., (Niles Tool Works Div.), Hamilton, O.
Greenerd Arbor Press, Nashua, N. H.
Hanchett Mfg. Co., Big Rapids, Mich.
Hydraulic Press Mfg. Co., Mt. Gilead, O.
*Lapointe Machine Tool Co., Hudson, Mass.
*Michigan Tool Co., Detroit, Mich.
Nixon Gear & Machine Co., Syracuse
*Oilgear Co., Milwaukee, Wis.
*Thompson Grinder Co., Springfield, O.

BUFFERS & POLISHERS
Acme Mfg. Co., Detroit, Mich.
Baldor Electric Co., St. Louis, Mo.
*Black & Decker Mfg. Co., Towson, Md.
Blount, J. G., Everett, Mass.
Bridgeport Safety Emery Wheel Co., Bridgeport, Conn.
Buckeye Portable Tool Co., Dayton, O.
Champion Blower & Forge Co., Lancaster, Pa.
Chicago Pneumatic Tool Co., N. Y. C.
*Cincinnati Electrical Tool Co., Cincinnati, O.
Clark, Jas. Jr., Electric Co., Louisville, Ky.
Cleveland Elec. Motor Co., Cleveland, O.
*Continental Machines, Inc., Minneapolis, Minn.
Continental Roll & Steel Fdry., E. Chicago, Ind.
Crown Rheostat & Supply Co., Chicago
*Delta Mfg. Co., Milwaukee, Wis.
Diehl Mfg. Co., Elizabethport, N. J.
Divine Bros. Co., Utica, N. Y.
*Dumore Co., Racine, Wis.
Excelsior Tool & Machine Co., E. St. Louis, Ill.
Forbes & Myers, Worcester, Mass.
*Gardner Machine Co., Beloit, Wis.
*Hammond Machinery Bldrs., Inc., Kalamazoo, Mich.
Hanchett Mfg. Co., Big Rapids, Mich.
Hanson-Van Winkle-Munning Co., Mattawan, N. J.
*Haskins Co., R. G., Chicago
Hisey-Wolf Machine Co., Cincinnati, O.
Independent Pneumatic Tool Co., Chicago
Ingersoll-Rand Co., N. Y. C.

VIBRATION-PROOF!

UNSHAKO —the NUT that can't shake loose

Reg. U. S. Pat. Off.

Pat'd. and Pat's. Pending

The self-energizing locking ring springs to life as soon as any vibration—no matter how severe—tries to unwind the "Unshako" and positively prevents it.

Order "Unshako", this neatly ingenious and unfailing protection against costly troubles caused by ordinary nuts shaking loose.

STANDARD PRESSED STEEL CO.
JENKINTOWN, PENNA. BOX 4
— BRANCHES —
BOSTON • DETROIT • INDIANAPOLIS • CHICAGO • ST. LOUIS • SAN FRANCISCO

JONES MACHINE TOOL WORKS, Inc.
Manufacturers of
VERTICAL SHAPERS · SLOTTERS · STRAIGHT EDGES
VERTICAL BORING MILLS
HORIZONTAL BORING MILLS
SURFACE PLATES AND SPECIAL MACHINERY
5300 LANSDOWNE AVENUE, PHILADELPHIA, PA.

LUCAS "PRECISION"
Horizontal Boring, Drilling and Milling Machine
THE LUCAS MACHINE TOOL CO.
NOW AND ALWAYS OF
CLEVELAND
OHIO, U. S. A.

WHERE-TO-BUY DIRECTORY

** Indicates further information to be found in advertising pages.*

*Landis Tool Co., Waynesboro, Pa.
L'Hommedieu & Sons Co., Chas. F., Chicago
Mall Tool Co., Chicago
*Mattison Machine Works, Rockford, Ill.
Oliver Machinery Co., Grand Rapids, Mich.
*New Britain-Gridley Mach. Co., New Britain, Conn.
Packer Machine Co., Meriden, Conn.
*Pratt & Whitney Div. Niles-Bement-Pond Co., Hartford, Conn.
Production Machine Co., Greenfield, Mass.
Prosser & Son, Thomas, N. Y. C.
Rome Machry. Sales & Engrg. Co., Rome, N. Y.
Rotor Air Tool Co., Cleveland, O.
Royersford Fdry. & Mach. Co., Royersford, Pa.
Schauer Machine Tool Co., Cincinnati, O.
Shakespeare Products Co., Kalamazoo, Mich.
*Standard Electrical Tool Co., Cincinnati
Stanley Electrical Tool Div. of Stanley Works, New Britain, Conn.
Stow Mfg. Co., Binghamton, N. Y.
Strand & Co., N. A., Chicago
Swartz & White Mfg. Co., Binghamton, N. Y.
Udylite Co., Detroit, Mich.
U. S. Electrical Tool Co., Cincinnati, O.
Van Dorn Electrical Tool Co., Towson, Md.
Vonnegut Moulder Corp., Indianapolis
*Walker-Turner Co., Plainfield, N. J.

BULLDOZERS
*Ajax Mfg. Co., Euclid, Cleveland, O.
*Baldwin-Southwark Corp., Paschall, Philadelphia, Pa.
Beatty Machine & Mfg Co., Hammond, Ind.
Chambersburg Engineering Co., Chambersburg, Pa.
Columbia Machine Tool Co., Hamilton, O.
Elmes Eng. Works, Chas. F., Chicago
Hydraulic Press Mfg. Co., Mt. Gilead, O.
Keckley, O. C., Chicago
Rock River Machine Co., Janesville, Wis.
*Watson-Stillman Co., Roselle, N. J.
Williams, White & Co., Moline, Ill.
Wood Company, R. D., Philadelphia, Pa.

BURNERS, Gas & Oil Furnace
*American Gas Furnace Co., Elizabeth, N. J.
Hauck Mfg. Co., Brooklyn, N. Y.
*Hones, Inc., Charles A., Baldwin, N. Y.
North American Mfg. Co., Cleveland, O.
Rockwell Co., W. S., N. Y. C.
Scovill Mfg. Co., Waterbury, Conn.
Strong, Carlisle & Hammond Co., Cleveland, O.
*Surface Combustion Corp., Toledo, O.

BURNISHERS, Gear
Cimatool Co., Dayton, O.
Colonial Broach Co., Detroit, Mich.
Detroit Tap and Tool Co., Detroit, Mich.
*Fellows Gear Shaper Co., Springfield, Vt.
*Gleason Works, Rochester, N. Y.
*Michigan Tool Co., Detroit, Mich.
*Natl. Broach & Machine Co., Detroit
*Pratt & Whitney Div. Niles-Bement-Pond Co., Hartford, Conn.

BURNISHING Machines
Baird Machine Co., Bridgeport, Conn.
Cimatool Co., Dayton, Ohio
*Consolidated Machine Tool Corp., Rochester, N. Y.
Cosa Oversea Trading Corp., New York, N. Y.
*Fellows Gear Shaper Co., Springfield, Vt.
*General Machinery Corp., Niles Tool Works Div., Hamilton, O.
*Michigan Tool Co., Detroit, Mich.
Taylor Wilson Mfg. Co., McKees Rocks, Pa. (Tube & Bar)

BURRING Machines
*Ajax Mfg. Co., Euclid, Cleveland, O.
Bliss Co., E. W., Brooklyn, N. Y.
*Cincinnati Electrical Tool Co., Cincinnati, O.
*Consolidated Mach. Tool Corp., Rochester, N. Y.
Cross Gear & Machine Co., Detroit, Mich.
*Hill Acme Co., Cleveland, O.
*National Broach & Machine Co., Detroit
National Machinery Co., Tiffin, Ohio
*Niagara Mach. & Tool Co., Buffalo, N. Y.
Peck, Stow & Wilcox Co., Southington, Conn.
*Pratt & Whitney Div. Niles-Bement-Pond Co., Hartford, Conn.

BUSHINGS, Drill
*Carboloy Co., Detroit, Mich.
Colonial Broach & Machine Co., Detroit
Detroit Tap & Tool Co., Detroit, Mich.
*Ex-Cell-O Corp., Detroit, Mich.
Jig Bushing Co., Pontiac, Mich.
*Metal Carbides Corp., Youngstown, O.
*Universal Engrg. Co., Frankenmuth, Mich.

CABINETS, Steel (see LOCKERS & SHELVING)

CALIPERS & COMPASSES
*Armstrong Bros. Tool Co., Chicago
*Brown & Sharpe Mfg. Co., Providence, R. I.
*Farrel-Birmingham Co., Inc., Ansonia, Conn.
*Lufkin Rule Co., Saginaw, Mich.
Millers Falls Co., Greenfield, Mass.
*Randall & Stickney, Waltham, Mass.
Scherr Co., Geo., N. Y. C.
*Slocomb Co., J. T., Providence, R. I.
*Starrett Co., L. S., Athol, Mass.

CAMS, Machine
*Brown & Sharpe Mfg. Co., Providence, R. I.
Cimatool Co., Springfield St., Dayton, O.
Cross Gear & Machine Co., Detroit, Mich.
*Hartford Special Machinery Co., Hartford, Conn.
Heppenstall Co., Pittsburgh, Pa.
Kux-Lohner Machine Co., Chicago
Massachusetts Gear & Tool Co., Woburn, Mass.
Modern Collett & Mach. Co., Ecorse, Mich.
Rowbottom Machine Co., Waterbury, Conn.

CARBURIZERS (See also BOXES, Heat-Treating & Annealing)
*American Gas Furnace Co., Elizabeth, N. J.
Holden Co., A. F., New Haven, Conn.
Houghton & Co., E. F., Philadelphia
Leeds & Northrup Co., Philadelphia, Pa.
Rockwell Co., W. S., New York, N. Y.
*Surface Combustion Corp., Toledo, O.

CARDS & BRUSHES, File
*Disston & Sons, Inc., Henry, Tacony, Philadelphia
Manufacturers Brush Co., Cleveland, O.
*Nicholson File Co., Providence, R. I.
Watson-Williams Mfg. Co., Leicester, Mass.

CELLS, Photo-Electric
Continental Electric Co., Geneva, Ill.
General Electric Co., Schenectady, N. Y.
General Scientific Corp., Chicago, Ill.
Loewenberg, Dr. F., New York, N. Y.
National Carbon Co., New York, N. Y.
Westinghouse Lamp Div., Bloomfield, N. J.
Weston Electrical Inst. Corp., Newark, N. J.

CEMENT, Belt
Chicago Rawhide Mfg. Co., Chicago, Ill.
*Desmond-Stephan Mfg. Co., Urbana, O.
Dixon Crucible Co., Jos., Jersey City, N. J.
Goodrich Co., B. F., Akron, O.
Graton & Knight Co., Worcester, Mass.
Houghton & Co., E. F., Philadelphia, Pa.
Rhoads & Sons, J. E., Philadelphia, Pa.

CEMENT, Disk-Wheel
*Bakelite Corp., New York, N. Y.
*Gardner Machine Co., Beloit, Wis.
Hanchett Mfg. Co., Big Rapids, Mich.
Maas & Waldstein, Newark, N. J.
Walls Sales Corp., New York, N. Y.

CEMENT, Refractory
Atlas Lumnite Cement Co., Chicago, Ill.
Babcock & Wilcox Co., New York, N. Y.
Betson Plastic Fire Brick Co., Buffalo, N. Y.
Botfield Refractories Co., Phila., Pa.
Carborundum Co., Niagara Falls, N. Y.
Denver Fire Clay Co., Denver, Col.
General Refractories Co., Philadelphia
Green Fire Brick Co., Mexico, Mo.
Harbison-Walker Refractories Co., Pittsburgh
Johns-Manville, New York, N. Y.
North American Refractories Co., Cleveland, O.
*Norton Company, Worcester, Mass.
Plibrico Jointless Firebrick Co., Chicago
Quigley Co., Inc., New York, N. Y.

CENTERING Machines
*Consolidated Mach. Tool Corp., Rochester, N. Y.
Garrison Machine Works, Inc., Dayton, Ohio
*General Machinery Corp. (Niles Tool Works Div.), Hamilton, O.
*Hanson-Whitney Machine Co., Hartford, Conn.
Heller Machine Co., New York, N. Y.
*Hendey Machine Co., Torrington, Conn.
*Jones & Lamson Machine Co., Springfield, Vt.
Logansport Machine, Inc., Logansport, Ind.
*Pratt & Whitney Div., Niles-Bement-Pond Co., Hartford, Conn.
*Seneca Falls Machine Co., Seneca Falls, N. Y.
*Sundstrand Machine Tool Co., Rockford, Ill.
Whiton Machine Co., D. E., New London, Conn.

CENTERS, Bench
*Brown & Sharpe Mfg. Co., Providence, R. I.
Dearborn Gage Co., Dearborn, Mich.
*Pratt & Whitney Div., Niles-Bement-Pond Co., Hartford, Conn.
*Starrett Co., L. S., Providence, R. I.

CENTERS, Machine
*Abrasive Machine Tool Co., East Providence, R. I.
*Brown & Sharpe Mfg. Co., Providence, R. I.
*Bullard Company, Bridgeport, Conn.
*Carboloy Co., Detroit, Mich.
*Cincinnati Lathe & Tool Co., Oakley, Cincinnati, O.
*Cleveland Twist Drill Co., Cleveland, O.
Eclipse Counterbore Co., Detroit, Mich.
Fansteel Metallurgical Corp., N. Chicago, Ill.
*Firth-Sterling Steel Co., McKeesport, Pa.
*Gisholt Machine Co., Madison, Wis.
Gorham Tool Co., Detroit, Mich.
Gould & Eberhardt, Irvington, N. J.
Haynes Stellite Co., Kokomo, Ind.
*Hendey Machine Co., Torrington, Conn.
*Knight Machinery Co., W. B., St. Louis
McKenna Metals, Inc., Latrobe, Pa.
*Metal Carbides Corp., Coungstown, O.
*Michigan Tool Co., Detroit, Mich.
Morse Tool Co., Detroit, Mich.
Morse Twist Drill & Mach. Co., New Bedford, Mass.
*Pratt & Whitney Div., Niles-Bement-Pond Co., Hartford, Conn.
*Ready Tool Co., Bridgeport, Conn.
*Scully-Jones & Co., Chicago, Ill
Standard Tool Co., Cleveland, Ohio
Super Tool Co., Detroit, Mich.
*Taft-Peirce Mfg. Co., Woonsocket, R. I.
Tungsten Carbide Tool Co., Detroit, Mich.
*Vascoloy Ramet Corp., N. Chicago, Ill.
*Warner & Swasey Co., Cleveland, O.
Wesson Co., Detroit, Mich.
Whitman & Barnes, Detroit, Mich.

CENTRIFUGALS (See PURIFIERS, Oil & Coolant)

FIVE QUICK FACTS

ABOUT UNIVERSAL DRILL BUSHINGS

KNURLED HEAD allows better grip.

BLACK DOME improves appearance, resists rust.

SUPER-FINISH BORE straight and round within .0001 assures accuracy and unexcelled wearing qualities.

NICKLE STEEL LOCK SCREWS provide extra strength.

CADMIUM PLATED SCREWS prevent rusting.

WRITE FOR COMPLETE FACTS AND PRICES . . .

UNIVERSAL ENGINEERING CO.
FRANKENMUTH, MICHIGAN

DRILL and PILOT BUSHINGS

Frictionless—Rotary

For core drilling, T. C. and high speed boring, turret tool piloting, etc. Won't stick or clog. Dust proof as a watch.

Write for details.

GIERN & ANHOLTT TOOL CO.
1312 Mt. Elliott Ave. Detroit, Mich.

WHERE-TO-BUY DIRECTORY

** Indicates further information to be found in advertising pages.*

CHAIN, Forged-Steel Link
- *American Chain & Cable Co., Bridgeport, Conn.
- Bartlett & Snow, C. O., Cleveland, O.
- Brewer-Titchener Corp., Cortland, N. Y.
- Clapp Mfg. Co., E. D., Auburn, Ill.
- Chain Belt Co., Milwaukee, Wis.
- Columbus-McKinnon Chain Corp., Tonawanda, N. Y.
- Endicott Forging & Mfg. Co., Inc., Endicott, N. Y.
- Jeffrey Mfg. Co., Columbus, O.
- Link-Belt Co., Chicago, Ill.
- McKay Co., Pittsburgh, Pa.
- Palmer-Bee Co., Detroit, Mich.
- Scully Steel Products Co., Chicago
- Transue & Williams Steel Forging Corp., Alliance, Ohio

CHAINS, Conveyor
- *Allis-Chalmers Mfg. Co., Milwaukee, Wis.
- *American Chain & Cable Co., Bridgeport, Conn.
- American Manganese Steel Div. of American Brake Shoe & Fdry. Co., Chicago Hgts., Ill.
- Baldwin-Duckworth Chain Corp., Springfield, Mass.
- Bartlett & Snow, C. O., Cleveland, O.
- Boston Gear Works Inc., N. Quincy, Mass.
- Chain-Belt Co., Milwaukee, Wis.
- Diamond Chain & Mfg. Co., Indianapolis
- Dodge Mfg. Co., Mishawaka, Ind.
- Foote Gear Works, Inc., Chicago
- Jeffrey Mfg. Co., Columbus, O.
- Link-Belt Co., Indianapolis, Ind.
- Palmer-Bee Co., Detroit, Mich.
- Stephens-Adamson Mfg. Co., Aurora, Ill.
- Whitney Chain & Mfg. Co., Hartford, Conn.

CHAINS, Transmission
- Bilgram Gear & Machine Works, Philadelphia
- Boston Gear Works Inc., N. Quincy,
- *Cincinnati Gear Co., Cincinnati, Ohio
- Diamond Chain & Mfg. Co., Indianapolis, Ind.
- Link-Belt Co., Indianapolis, Ind.
- Morse Chain Co., Ithaca, N. Y.
- Ohio Gear Co., Cleveland, Ohio
- Palmer-Bee Co., Detroit, Mich.
- *Philadelphia Gear Works, Philadelphia
- Ramsey Chain Co., Albany, N. Y.
- Whitney Chain & Mfg. Co., Hartford, Conn.

CHAMFERING Machines
- Bilgram Gear & Machine Works, Philadelphia
- Cimatool Co., Dayton, Ohio
- *Consolidated Machine Tool Corp., Rochester, N. Y.
- Cross Gear & Machine Co., Detroit
- *Grant Mfg. & Machine Co., Bridgeport, Conn.
- Lipe, Inc., W. C., Syracuse, N. Y.
- *Murchey Machine & Tool Co., Detroit
- *National Broach & Machine Co., Detroit
- Thomas Machine Mfg. Co., Pittsburgh

CHARGERS, Battery
- Baker-Raulang Co., Cleveland, O.
- Cutler Hammer, Inc., Milwaukee, Wis.
- Fansteel Metallurgical Corp., N. Chicago, Ill.
- General Electric Co., Schenectady, N. Y.
- Raytheon Mfg. Co., Waltham, Mass.
- Ward Leonard Elec. Co., Mt. Vernon, N. Y.
- *Westinghouse Elec. & Mfg. Co., E. Pittsburgh, Pa.

CHASERS (See DIE-HEADS, Solid Adjustable)

CHECKS, Metal, Time and Tool
- Bates, H. O., Elizabeth, N. J.
- H. K. Metal Craft Mfg. Corp., N. Y. C.
- *Noble & Westbrook Mfg. Co., East Hartford, Conn.
- Revere Copper & Brass Inc., N. Y. C.
- Scovill Mfg. Co., Waterbury, Conn.
- Wrought Washer Mfg. Co., Milwaukee

CHESTS, Tool
- Berger Mfg. Co. (Sub. of Republic Steel Corp., Canton, O.
- Blackhawk Mfg. Co., Milwaukee, Wis.
- Frick-Gallagher Mfg. Co., Wellston, O.
- *Geometric Tool Co., New Haven, Conn.
- Gerstner & Sons, H., Dayton, O.
- *Lufkin Rule Co., Saginaw, Mich.
- Seamless Prod. Co., N. Y. C.
- Stanley Tools, New Britain, Conn.
- Union Steel Chest Corp., LeRoy, N. Y.
- Western Tool & Mfg. Co., Springfield, O.

CHISELS, Hand (See TOOLS, Hand)

CHISELS, Chipping, Pneumatic & Electric Hammer
- *Bethlehem Steel Co., Bethlehem, Pa.
- *Black & Decker Mfg. Co., Towson, Md.
- Chicago Pneumatic Tool Co., New York
- Cincinnati Tool Co., Cincinnati, O.
- Cleveland Pneumatic Tool Co., Cleveland
- Drew, C., & Co., Kingston, Mass.
- Hubbard & Co., Pittsburgh, Pa.
- Independent Pneumatic Tool Co., Chicago
- Ingersoll-Rand Co., N. Y. C.
- Lippert, E. T., Saw Co., Pittsburgh, Pa.
- Oxford Tool Co., Philadelphia, Pa.
- Plomb Tool Co., Los Angeles, Calif.
- Salem Tool Co., The, Salem, Ohio
- *Scully-Jones & Co., Chicago, Ill.
- Stanley Electric Tool Div., The Stanley Works, New Britain, Conn.
- Star Bit & Tool Co., Rockford, Ill.
- Van Dorn Elec. Tool Co., Towson, Md.

CHUCKING MACHINES (See also LATHES, Automatic & Semi-Automatic)
- Baird Machine Co., Bridgeport, Conn.
- *Bullard Co., Bridgeport, Conn.
- *Cincinnati Lathe & Tool Co., Oakley, Cincinnati
- *Cleveland Automatic Machine Co., Cleveland
- *Cone Automatic Machine Co., Windsor, Vt.
- Foote-Burt Co., Cleveland, O.
- *Foster Machine Co., Elkhart, Ind.
- *Gisholt Machine Co., Madison, Wis.
- *Gorton Machine Co., George, Racine, Wis.
- *Goss & deLeeuw Mach. Co., New Britain, Conn.
- *Jones & Lamson Machine Co., Springfield, Vt.
- *Lees-Bradner Co., Cleveland, O.
- *National Acme Co., Cleveland, O.
- *New Britain-Gridley Mach. Div., New Britain, Conn.
- *Potter & Johnston Machine Co., Pawtucket, R. I.
- *Warner & Swasey Co., Cleveland, O.

CHUCKS, Collet (See Collets)

CHUCKS, Drill & Tap
- Alco Tool Co., Bridgeport, Conn.
- Apex Mach. & Tool Co., Dayton, Ohio
- Buhr Machine Tool Co., Ann Arbor, Mich.
- Chicago Pneumatic Tool Co., N. Y. C.
- Chicago Tool & Engrg. Co., Chicago
- *Errington Mech. Lab., Stapleton, N. Y.
- *Etteo Tool Co., Brooklyn, N. Y.
- *Gisholt Machine Co., Madison, Wis.
- Independent Pneumatic Tool Co., Chicago
- *Jacobs Mfg. Co., Hartford, Conn.
- Jarvis Co., Chas. L., Middletown, Conn.
- Lee & Sons, K. O., Aberdeen, S. D.
- McCrosky Tool Corp., Meadville, Pa.
- Morse Tool Co., Detroit, Mich.
- Morse Twist Drill & Mach. Co., New Bedford, Mass.
- Nielsen Tool & Die Co., Berkley, Mich.
- North Bros. Mfg. Co., Philadelphia, Pa.
- Procunier Safety Chuck Co., Chicago
- *Rivett Lathe & Grinder, Inc., Boston
- *Scully-Jones & Co., Chicago
- Skinner Chuck Co., New Britain, Conn.
- Standard Tool Co., Cleveland, O.
- *Thomas Hoist Co., Chicago, Ill.
- Westcott Chuck Co., Oneida, N. Y.

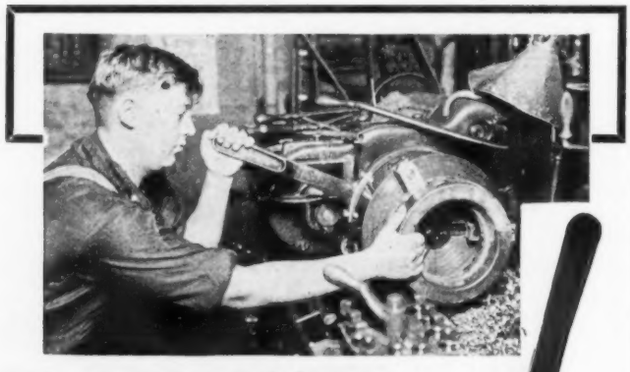
CHUCKS, Drill, Quick-Change, Collet
- Chicago Tool & Eng. Co., Chicago
- Collis Co., Clinton, Iowa
- *Errington Mech. Lab., Stapleton, N. Y.
- Gairing Tool Co., Detroit, Mich.
- Glenzer, J. C., Co., Detroit, Mich.
- Jarvis, Chas. L. Co., Middletown, Conn.
- *Modern Tool Works, Div. Consol. Mach. Tool Corp., Rochester, N. Y.
- Procunier Safety Chuck Co., Chicago
- Scully-Jones & Co., Tool Division, Chicago

CHUCKS, Gear
- Cimatool Co., Dayton, O.
- Cotta Gear Co., Rockford, Ill.
- Cushman Chuck Co., Hartford, Conn.
- Garrison Machine Works, Inc., Dayton, O.
- *Gleason Works, Rochester, N. Y.
- *LeMaire Tool & Mfg. Co., Dearborn, Mich.
- Logansport Machine Inc., Logansport, Ind.
- Skinner Chuck Co., New Britain, Conn.
- Whiton, D. E., Machine Co., New London, Conn.

CHUCKS, Hydraulic
- Cross Gear & Machine Co., Detroit, Mich.
- Cushman Chuck Co., Hartford, Conn.
- *Gisholt Machine Co., Madison, Wis.
- Hannifin Mfg. Co., Chicago
- Logansport Machine Co., Logansport, Ind.
- *New Britain-Gridley Machine Div., New Britain, Conn.
- *Potter & Johnston Machine Co., Pawtucket, R. I.
- Skinner Chuck Co., New Britain, Conn.
- *Tomkins-Johnson Co., Jackson, Mich.
- *Warner & Swasey Co., Cleveland, O.

CHUCKS, Magnetic
- *Abrasive Machine Tool Co., E. Providence, R. I.
- *Arter Grinding Machine Co., Worcester, Mass.
- *Brown & Sharpe Mfg. Co., Providence, R. I.
- *Heald Machine Co., Worcester, Mass.
- *L. W. Chuck Co., Toledo, O.
- Robbins Engrg. Co., Detroit, Mich.
- Steege Machine Co., Chicago, Ill.
- *Taft-Peirce Mfg. Co., Woonsocket, R. I.
- *Walker Co., O. S., Worcester, Mass.

CHUCKS, Lathe
- Atlas Press Co., Kalamazoo, Mich.
- Boice Crane Co., Toledo, Ohio
- *Cincinnati Lathe & Tool Co., Oakley, Cincinnati, O.
- Cushman Chuck Co., Hartford, Conn.
- *Delta Mfg. Co., Milwaukee, Wis.
- *Foster Machine Co., Elkhart, Ind.
- *Gisholt Machine Co., Madison, Wis.
- *Hardinge Brothers, Inc., Elmira, N. Y.
- Harnischfeger Corp., Milwaukee, Wis.
- *Hendey Machine Co., Torrington, Conn.
- Logansport Machine, Inc., Logansport, Ind.
- *L. W. Chuck Co., Toledo, O.
- McCrosky Tool Corp., Meadville, Pa.
- *Potter & Johnston Machine Co., Pawtucket, R. I.
- *Pratt & Whitney Div. Niles-Bement-Pond Co., Hartford, Conn.



NO TIME WASTED
in wrenching and adjusting-BARKER

Wrenchless
CHUCK

You don't have to stop the lathe to release and re-chuck, unless work is too heavy to handle. Simply pull the lever, and the piece is chucked and accurately centered. The Barker is in use in the largest and best equipped shops in the world, helping to increase production to very high percentages. It is easily fitted to any lathe — made with two or three jaws.

—requires no accessories to install, a quick movement of the lever releases or grips the work. Adapted for a diversified line, from small brass castings to heavy forgings.

Get the Barker Wrenchless Chuck in your service now—get the immediate benefits—write for Catalog giving complete details. Prompt deliveries.

THOMAS HOIST CO.
Chuck Division
18 So. Hoyne Ave.
CHICAGO, ILLINOIS

GOSS and DE LEEUW
MULTIPLE SPINDLE
CHUCKING MACHINES
Four, Five, Six, Eight Spindles • Work and Tool Rotating Types.
GOSS & DE LEEUW MACHINE CO., NEW BRITAIN, CONN.

WHERE-TO-BUY DIRECTORY

*Rivett Lathe & Grinder Co., Inc., Boston, Mass.
Scherr Co., Geo., New York, N. Y.
Sjogren Mfg. Co., Los Angeles, Cal.
Skinner Chuck Co., New Britain, Conn.
Stark Tool Co., Waltham, Mass.
Steege Machinery Co., Chicago
*Thomas Hoist Co, Chicago, Ill.
*Tomkins-Johnson Co., Jackson, Mich.
Union Mfg. Co., New Britain, Conn.
Westcott Chuck Co., Oneida, N. Y.
Whiton, D. E., Mfg. Co., New London, Conn.

CHUCKS, Motorized Electric
Cushman Chuck Co., Hartford, Conn.
*Goss & deLeeuw Machine Co., New Britain, Conn.
*Potter & Johnston Machine Co., Pawtucket, R. I.
*Warner & Swasey Co., Cleveland

CHUCKS, Pneumatic
*Airgrip Chuck Div. of Anker, Holth Mfg. Co., Port Huron, Mich.
Cushman Chuck Co., Hartford, Conn.
Hanna Engineering Works, Chicago
Hannifin Mfg. Co., Chicago
Logansport Machine Inc., Logansport, Ind.
*Potter & Johnston Machine Co., Pawtucket, R. I.
Skinner Chuck Co., New Britain, Conn.
*Tomkins-Johnson Co., Jackson, Mich.
*Warner & Swasey Co., Cleveland, O.

CHUCKS, Ring-Wheel
*Abrasive Machine Tool Co., E. Providence, R. I.
Bridgeport Safety Emery Wheel Co., Inc., Bridgeport, Conn.
*Gardner Machine Co., Beloit, Wis.
Hanchett Mfg. Co., Big Rapids, Mich.

CHUCKS, Spring
*Brown & Sharpe Mfg. Co., Providence, R. I.
Harnischfeger Corp., Milwaukee, Wis.
Modern Collet & Machine Co., Ecorse, Detroit, Mich.
Morrison Machine Products Div., Elmira, N. Y.
*Rivett Lathe & Grinder Inc., Brighton, Boston, Mass.

CLAMPS, Machinist's
*Advance Machine Works, Ft. Wayne, Ind.
*Armstrong Bros. Tool Co., Chicago, Ill.
Automatic Vise Sales Co., Los Angeles, Calif.
Billings & Spencer, Hartford, Conn.
Blackhawk Mfg. Co., Milwaukee, Wis.
Bonney Forge & Tool Works, Allentown, Pa.
*Brown & Sharpe Mfg. Co., Providence, R. I.
Cincinnati Clamp Co., Cincinnati, O.
Cincinnati Tool Co., Cincinnati, O.
Knu-Vise Products Co., Inc., Detroit
*Lufkin Rule Co., Saginaw, Mich.
North Bros. Mfg. Co., Philadelphia, Pa.
Peck, Stow & Wilcox, Southington, Conn.
Sargent & Co., New Haven, Conn.
Western Tool & Mfg. Co., Springfield, O.
*Williams & Co., J. H., N. Y. C.

CLEANING EQUIPMENT (See METAL-CLEANING EQUIPMENT)

CLOTH, Abrasive (See PAPER & CLOTH, Abrasive)

CLUTCHES, Friction
*Ajax Mfg. Co., Euclid, Cleveland, O.
*Allis-Chalmers Mfg. Co., Milwaukee, Wis.
Conway Clutch Co., Cincinnati, O.
Dodge Mfg. Corp., Mishawaka, Ind.
Dreis & Krump Mfg. Co., Chicago
General Tire & Rubber Co., Akron, O.
*Errington Mach. Lab., Stapleton, N. Y.
*Fairbanks, Morse & Co., Chicago

MAGNETIC CHUCKS

Also Mfr's of
Demagnetizers
Lathe Chucks
Milling Machine Vises
Power Hack Saws
Dividing Heads

WATERPROOF
for Wet or Dry Grinding

Guaranteed to provide highest magnetic holding power on 110 or 220 Volts D. C. Scientifically designed and made of the highest grade materials. Made in 4 sizes.

5¾"x13" Size	$ 42.50	8"x24" Size	$ 95.00
6½"x18" Size	55.00	10¾"x37" Size	175.00

Send today for new free catalogue

L-W CHUCK CO.
1-7 N. ST. CLAIR ST., TOLEDO, OHIO

THE JOHNSON FRICTION CLUTCH

Left — Single Clutch with pulley.

Below — Double Clutch exterior.

. . for maximum serviceability in minimum space

The adaptability of JOHNSON FRICTION CLUTCHES to hundreds of different kinds of machines has been possible by the compactness of these sensitive, durable units.

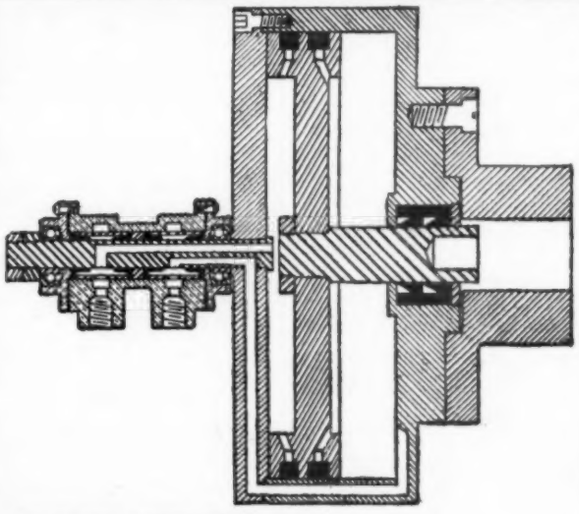
Many leading manufacturers of industrial machinery have standardized on JOHNSON CLUTCHES because their adoption involved minimum changes in design, and assured a maximum in clutch performance.

In addition to compactness, JOHNSON CLUTCHES offer quick, smooth starting. They are available for high speed on light powered drives and can be depended on for safety, durability and economy.

Let us show you how easy it is to engineer the JOHNSON CLUTCH into your machines. Just send us details of how you propose to apply the clutch. Ask for our assistance today.

Write for 1940 Blue Clutch Catalog No. 14 covering expanding ring clutches and our literature covering the "Maxitorq" floating plate disc type.

THE CARLYLE JOHNSON MACHINE CO. MANCHESTER, CONN.



AIRGRIP BALL BEARING CYLINDERS

Speed Chucking Equipment

The operation of all types of Chucking Equipment can be profitably accelerated with Airgrip Ball Bearing Cylinders, accuracy promoted, and time formerly spent in adjusting, trueing, etc., saved for production.

Adaptable also to many other types of work where air control can be efficiently applied. Write us for application suggestions and quotations.

AIRGRIP CHUCK DIVISION
OF
ANKER-HOLTH MANUFACTURING COMPANY
Port Huron, Mich.

WHERE-TO-BUY DIRECTORY

** Indicates further information to be found in advertising pages.*

CLUTCHES, Friction (Cont.)

*Foote Bros. Gear & Mach. Corp., Chicago
General Tire & Rubber Co., Akron, O.
*Hanson Clutch & Mach. Co., Tiffin, O.
*Hill Acme Co., Cleveland, O.
Hilliard Corporation, Elmira, N. Y.
Industrial Clutch Co., Waukesha, Wis.
Jeffrey Mfg. Co., Columbus, O.
*Johnson Machine Co., Carlyle, Manchester, Conn.
Link-Belt Co., Chicago, Ill.
Lipe, Inc., W. C., Syracuse, N. Y.
Medart Co., St. Louis, Mo.
*Morse Chain Co., Ithaca, N. Y.
National Machinery Co., Tiffin, O.
Ramsey Chain Co., Albany, N. Y.
Reeves Pulley Co., Indianapolis, Ind.
Rockford Drilling Machine Div., Borg-Warner Corp., Rockford, Ill.
Royersford Fdry. & Mach. Co., Royersford, Pa.
*Savage Co., W. J., Knoxville, Tenn.
Twin Disc Clutch Co., Racine, Wis.

CLUTCHES, Magnetic

Cutler-Hammer, Inc., Milwaukee, Wis.
Dickson Automatic Clutch Co., Los Angeles, Calif.
Stearns Magnetic Mfg. Co., Milwaukee

COLLARS, Safety

American Pulley Co., Philadelphia, Pa.
Boston Gear Works, Inc., No. Quincy, Mass.
Bartlett & Snow, C. O., Cleveland, O.
Chain-Belt Co., Milwaukee, Wis.
Dodge Mfg. Corp., Mishawaka, Ind.
Hanson Clutch & Machy. Co., Tiffin, O.
Jeffrey Mfg. Co., Columbus, O.
*Johnson Machine Co., Carlyle, Manchester, Conn.
Link-Belt Co., Chicago, Ill.
Medart Co., St. Louis, Mo.
Royersford Fdry. & Mach. Co., Royersford, Pa.
*Standard Pressed Steel Co., Jenkintown, Pa.
Stephens-Adamson Mfg. Co., Aurora, Ill.

COLLARS, Spacing

*Atkins & Co., E. C., Indianapolis, Ind.
Boston Gear Works, Inc., N. Quincy, Mass.
Hanson Clutch & Machy. Co., Tiffin, O.
*Hill Acme Co., Cleveland, O.
Morse Twist Drill & Machine Co., New Bedford, Mass.
*Scully-Jones & Co., Chicago, Ill.
*Standard Pressed Steel Co., Jenkintown, Pa.

COLLECTORS, Dust

American Blower Corp., Detroit
American Fdy. Equip. Co., Mishawaka, Ind.
Binks Mfg. Co., Chicago, Ill.
*Buffalo Forge Co., Buffalo, N. Y.
Champion Blower & Forge Co., Lancaster, Pa.
Covel Mfg. Co., Benton Harbor, Mich.
Pangborn Corp., Hagerstown, Md.
Spencer Turbine Co., Hartford, Conn.
*Standard Electrical Tool Co., Cincinnati, O.
Sturtevant Co., B. F., Hyde Park, Boston, Mass.

COLLETS

Apex Mach. & Tool Co., Dayton, O.
*Brown & Sharpe Mfg. Co., Providence, R. I.
Buhr Mach. Tool Co., Ann Arbor, Mich.
*Cincinnati Lathe & Tool Co., Oakley, Cincinnati, O.
*Cincinnati Milling Mach. Co., Cincinnati, O.
*Cleveland Automatic Machine Co., Cleveland, O.
*Cone Automatic Machine Co., Windsor, Vt.
*Consolidated Machine Tool Corp., Rochester, N. Y.
Cushman Chuck Co., Hartford, Conn.
Davenport Machine Tool Co., Rochester, N. Y.
Erickson Steel Co., Cleveland, O.
*Foster Machine Co., Elkhart, Ind.
*Gisholt Machine Co., Madison, Wis.
Greenfield Tap & Die Corp., Greenfield, Mass.
Hannifin Mfg. Co., Chicago, Ill.
*Hardinge Brothers, Inc., Elmira, N. Y.
*Hendey Machine Co., Torrington, Conn.
Index Machinery Corp., Cincinnati, O.
Jarvis Co., Chas. L., Middletown, Conn.
Luers, J. Milton, Detroit, Mich.
*Milholland Sales & Mach. Co., Indianapolis, Ind.
Modern Collet & Machine Co., Detroit
Morrison Machine Products Inc., Elmira, N. Y.
Morse Twist Drill & Machine Co., New Bedford, Mass.
*National Acme Co., Cleveland, Ohio
National Automatic Tool Co., Richmond, Ind.
*National Twist Drill & Machine Co., Detroit
*New Britain-Gridley Machine Co., New Britain, Conn.
*Pratt & Whitney Div. Niles-Bement-Pond Co., Hartford, Conn.
Procunier Safety Chuck Co., Chicago
*Reed Prentice Co., Worcester, Mass.
*Rivett Lathe & Grinders, Inc., Boston
*Scully-Jones & Co., Chicago
Sjogren Mfg. Co., Los Angeles, Cal.
Standard Tool Co., Cleveland, O.
Stark Tool Co., Waltham, Mass.
*Tomkins-Johnson Co., Jackson, Mich.
*Union Twist Drill Co., Athol, Mass.
*Universal Engineering Co., Frankenmuth, Mich.
*Van Norman Machine Tool Co., Springfield, Mass.
Vinco Tool Co., Detroit, Mich.
*Warner & Swasey Co., Cleveland, O.

COMMUNICATION SYSTEMS, Shop

Graybar Electric Co., Inc., New York, N. Y.
Western Electric Co., Kearny, N. J.

COMPARATORS, Dial

*Brown & Sharpe Mfg. Co., Providence, R. I.
*Federal Products Corp., Providence, R. I.
Marburg Brothers, Inc., New York, N. Y.
Mico Instrument Co., Cambridge, Mass.
*Pratt & Whitney Div. Niles-Bement-Pond Co., Hartford, Conn.
Scherr Co., Inc., Geo., New York, N. Y.
*Sheffield Gage Corp., Dayton, O.
*Starrett Co., L. S., Athol, Mass.
*Taft-Peirce Mfg. Co., Woonsocket, R. I.
Van Keuren Co., Watertown, Mass.

COMPARATORS, Gear-Tooth & Screw-Thread

Bausch & Lomb Optical Co., Rochester, N. Y.
*Farrel-Birmingham Co., Buffalo, N. Y.
*Jones & Lamson Machine Co., Springfield, Vt.
*Pratt & Whitney Div. Niles-Bement-Pond Co., Hartford, Conn.
Scherr Co., Inc., New York, N. Y.
*Starrett Co., L. S., Athol, Mass.

COMPARATORS, Surface-Roughness

Physicists Research Co., Ann Arbor, Mich.
Zeiss Co., Carl, New York, N. Y.

COMPASSES, Beam (See DRAFTING-ROOM SUPPLIES)

COMPASSES, Metal-Scribing (See CALIPERS & COMPASSES)

COMPOUNDS, Cleaning

Bendix Aviation Corp., South Bend, Ind.
*Bullard Co., Bridgeport, Conn.
Cowles Detergent Co., Cleveland, O.
Curran Corp., Somerville, Mass.
Detroit Rex Products Co., Detroit, Mich.
Enthone Co., New Haven, Conn.
Estox Products & Co., New Haven, Conn.
Ford Co., J. B., Wyandotte, Mich.
Houghton & Co., E. F., Philadelphia
Magnus Chemical Co., Garwood, N. J.
Meaker Company, Chicago, Ill.
Oakite Products, New York, N. Y.
Puritan Mfg. Co., Waterbury, Conn.
Quigley Co., New York City
Rapid Electroplating Process, Inc., Chicago
Wayne Chemical Products, Div. Wayne Soap Co., Detroit, Mich.

COMPOUNDS, Drawing, Metal & Wire

Cowles Detergent Co., Cleveland
Dixon, Jos., Crucible Co., Jersey City, N. J.
Houghton & Co., E. F., Philadelphia
Shell Oil Co., Inc., N. Y. C.
Swan Finch Oil Co., N. Y. C.
Wayne Chemical Products, Div. Wayne Soap Co., Detroit, Mich.

COMPOUNDS, Grinding & Polishing

*Abrasive Company, Philadelphia, Pa.
Carborundum Co., Niagara Falls, N. Y.
*Clover Mfg. Co., Norwalk, Conn.
General Abrasive Co., Niagara Falls, N. Y.
Iding Disc Grinding Compound Co., Milwaukee, Wis.
*National Broach & Machine Co., Detroit
*Norton Co., Worcester, Mass.

COMPOUNDS, Plastic Molding

American Cyanamid Co., N. Y. C.
*Bakelite Corp., New York, N. Y.
Carbide & Carbon Chem. Co., N. Y. C.
Catalin Corp., New York, N. Y.
Celluloid Corp., New York, N. Y.
Colt's Patent Fire Arms Mfg. Co., Hartford, Conn.
Continental Diamond Fibre Co., Newark, Del.
Cutler-Hammer Inc., Milwaukee, Wis.
*Dow Chemical Co., Midland, Mich.
du Pont, E. I., de Nemours & Co., Wilmington, Del.
Durez Plastics & Chemicals Inc., No. Tonawanda, N. Y.
Formica Insulation Co., Cincinnati, O.
General Electric Co., Schenectady, N. Y.
Goodrich, B. F. Co., Akron, O.
Goodyear Tire & Rubber Co., Akron, O.
Hercules Powder Co., Wilmington, Del.
Monsanto Chemical Co., St. Louis, Mo.
Nixon Nitration Works, E. Nixon, N. J.
Plaskon Corp., Toledo, O.
Synthane Corp., Oaks, Pa.
Tenn.-Eastman Corp., Kingsport, Tenn.
*Westinghouse Elec. & Mfg. Co., E. Pittsburgh

COMPOUNDS, Tempering & Case-Hardening

Bellis Heat Treating Co., Branford, Conn.
du Pont, E. I., de Nemours & Co., Wilmington, Del.
Houghton & Co., E. F., Philadelphia
*Oakite Products, Inc., New York, N. Y.
Strong, Carlisle & Hammond Co., Cleveland, O.
*Stuart Oil Co., D. A., Chicago, Ill.

COMPRESSORS, Air & Gas

*Allis-Chalmers Mfg. Co., Milwaukee, Wis.
*American Gas Furnace Co., Elizabeth, N. J.
Binks Mfg. Co., Chicago, Ill.
Chicago Pneumatic Tool Co., N. Y. C.
Curtis Pneumatic Machry. Co., St. Louis
De Laval Steam Turbine Co., Trenton, N. J.
DeVilbiss Company, Toledo, O.
Eclipse Air Brush Co., Newark, N. J.
Empire Compressor Mfg. Co., Cincinnati
*Fairbanks Morse & Co., Chicago, Ill.
General Electric Co., Schenectady, N. Y.
Independent Pneumatic Tool Co., Chicago
Ingersoll-Rand Co., New York, N. Y.
Mesta Machine Co., Pittsburgh, Pa.
Roots - Connersville - Wilbraham Blower Corp., Connersville, Ind.
Schramm Inc., West Chester, Pa.
Spencer Turbine Co., Hartford, Conn.
Spray Engrg. Co., Somerville, Mass.
Sullivan Machry. Co., Michigan City, Ind.
Worthington Pump & Machy. Corp., Harrison, N. J.
Wright Mfg. Div. of Amer. Chain & Cable Co., York, Pa.

CONTROLLERS, Motor

Aerovox Corp., New Bedford, Mass.
Allen-Bradley Co., Milwaukee, Wis.
*Allis-Chalmers Mfg. Co., Milwaukee, Wis.
Clark Controller Co., Cleveland, O.
Colt's Patent Fire Arms Mfg. Co., Hartford, Conn.
Cutler-Hammer, Inc., Milwaukee, Wis.
Durakool, Inc., Elkhart, Ind.
Electric Controller & Mfg. Co., Cleveland, O.
Euclid Electric & Mfg. Co., Cleveland, O.
*Fairbanks, Morse & Co., Chicago, Ill.
Forbes & Myers, Worcester, Mass.
General Electric Co., Schenectady, N. Y.
Graybar Electric Co., Inc., New York, N. Y.
Lincoln Electric Co., Cleveland, O.
Lipman Machine Co., Pittsburgh, Pa.
Monitor Controller Co., Baltimore, Md.
Square D Electric Co., Milwaukee, Wis.
Trumbull Electric Mfg. Co., Plainville, Conn.
Ward Leonard Elec. Co., Mt. Vernon, N. Y.
*Westinghouse Elec. & Mfg. Co., E. Pittsburgh, Pa.

CONTROLLERS, Pressure & Temperature

*American Gas Furnace Co., Elizabeth, N. J.
Automatic Temp. Control Co., Pittsburgh
Bristol Co., Waterbury, Conn.
*Brown Instrument Co. (A Div. of Minneapolis-Honeywell Reg. Co.), Phila.
Consolidated Ashcroft Hancock Co., Inc., Bridgeport, Conn.
Fenwal, Inc., Ashland, Mass.
Foxboro Co., Foxboro, Mass.
Illinois Testing Lab. Inc., Chicago
Industrial Instrument Co., Akron, O.
Leeds & Northrup Co., Philadelphia, Pa.
Lindberg Engrg. Co., Chicago
Manning, Maxwell & Moore, Inc., Bridgeport, Conn.
North American Mfg. Co., Cleveland, O.
Partlow Corp., New Hartford, N. Y.
Tagliabue Mfg. Co., C. J., Brooklyn, N. Y.
Taylor Instrument Co., Rochester, N. Y.
Thwing-Albert Instrument Co., Philadephia
Wheelco Instruments Co., Chicago

CONTROLS, Flexible-Shaft
(See SHAFTS, Flexible)

CONTROLS, Furnace

*American Gas Furnace Co., Elizabeth, N. J.
Bristol Co., Waterbury, Conn.
Foxboro Co., Foxboro, Mass.
Leeds & Northrup Co., Philadelphia, Pa.
Lindberg Engrg. Co., Chicago
Partlow Corp., New Hartford, N. Y.
Strong, Carlisle & Hammond Mach. Co., Cleveland
Tagliabue Mfg. Co., C. J., Brooklyn, N. Y.
Wheelco Instruments Co., Chicago

CONTROLS, Hydraulic

Hunt & Son Co., C. B., Salem, O.
Hydraulic Press Mfg. Co., Mt. Gilead, Ohio.
Hydro-Power Systems, Inc., Mt. Gilead, Ohio
*Oilgear Co., Milwaukee, Wis.
*Sundstrand Mach. Tool Co., Rockford, Ill.
*Vickers, Inc., Detroit, Mich.
*Watson-Stillman Co., Roselle, N. J.

CONVEYORS

*Allis-Chalmers Mfg. Co., Milwaukee, Wis.
Aluminum Ladder Co., Tarentum, Pa.

VEEDER-ROOT INC., Hartford, Conn.

WHERE-TO-BUY DIRECTORY

** Indicates further information to be found in advertising pages.*

American Mono-Rail Co., Cleveland
Audubon Wire Cloth Corp., Philadelphia
*Barrett-Cravens Co., Chicago, Ill.
Bartlett & Snow, C. O., Cleveland, O.
Boston Gear Works, Inc., N. Quincy, Mass.
Clark Equipment Co., Battle Creek, Mich.
Dodge Mfg. Co., Mishawaka, Ind.
Jeffrey Mfg. Co., Columbus, O.
Link-Belt Co., Chicago
Logan Co., Louisville, Ky.
Mathews Conveyor Co., Ellwood City, Pa.
Mech. Handling Systems, Inc., Detroit
Metzgar Co., Grand Rapids, Mich.
Palmer-Bee Co., Detroit, Mich.
Rotary Lift Co., Memphis, Tenn.
Standard Conveyor Co., N. St. Paul, Minn.
Stearns Magnetic Mfg. Co., Milwaukee
Stephens-Adamson Mfg. Co., Aurora, Ill.
U. S. Rubber Products, Inc., New York
Whitney Chain & Mfg. Co., Hartford, Conn.
Wickwire-Spencer Steel Co., N. Y. C.

COOLANTS, Cutting, Drilling & Grinding
Carborundum Co., Niagara Falls, N. Y.
Gulf Oil Corp., Pittsburgh, Pa.
Houghton & Co., E. F., Philadelphia, Pa.
*Oakite Products, Inc., New York, N. Y.
Shell Oil Co., Inc., St. Louis
*Socony-Vacuum Oil Co., Inc., N. Y. C.
*Standard Oil Co. of Ind., Chicago
*Stuart Oil Co., Ltd., D. A., Chicago
*Sun Oil Co., Philadelphia, Pa.
Tidewater Associated Oil Co., N. Y. C.
Wayne Chemical Products, Div. Wayne Soap Co., Detroit, Mich.

COOLANT SYSTEMS, Portable
Curran Machine Works, L. I. City, N. Y.

CORK PRODUCTS
Armstrong Cork Products Co., Lancaster, Pa.
Auburn Mfg. Co., Middletown, Conn.
Bond Mfg. Co., Wilmington, Del.
Chicago Cork Works Co., Chicago, Ill.
Felt Products Mfg. Co., Chicago, Ill.
Korfund Co., Long Island City, N. Y.
Liberty Cork Co., Jersey City, N. J.

COUNTERBORES
*Barnes Drill Co., Rockford, Ill.
*Butterfield Div. (Union Twist Drill Co.), Derby Line, Vt.
*Cleveland Twist Drill Co., Cleveland, O.
Eclipse Counterbore Co., Detroit, Mich.
*Ex-Cell-O Corp., Detroit, Mich.
Gairing Tool Co., Detroit, Mich.
Goddard & Goddard, Detroit, Mich.
Hall Planetary Co., Philadelphia, Pa.
Haynes Stellite Co., Kokomo, Ind.
Kelly Reamer Co., Cleveland, O.
*Michigan Tool Co., Detroit, Mich.
Morse Tool Co., Detroit, Mich.
Morse Twist Drill & Mach. Co., New Bedford, Mass.
National Tool Co., Cleveland, Ohio
*National Twist Drill & Tool Co., Detroit
Palmer-Bee Co., Detroit, Mich.
*Pratt & Whitney Div. Niles-Bement-Pond Co., Hartford, Conn.
Production Tool Co., Detroit, Mich.
Prosser & Sons, Thos., N. Y. C.
Putnam Tool Co., Detroit, Mich.
*Scully-Jones & Co., Chicago, Ill.
Standard Tool Co., Cleveland, O.
Super Tool Co., Detroit, Mich.
*Union Twist Drill Co., Athol, Mass.
*Vascaloy-Ramet Corp., N. Chicago, Ill.
Wesson Co., Detroit, Mich.
Whitman & Barnes, Detroit, Mich.

COUNTERSHAFTS
*American Tool Works Co., Cincinnati, O.
*Brown & Sharpe Mfg. Co., Providence, R. I.
*Cincinnati Lathe & Tool Co., Oakley, Cincinnati, O.
Dodge Mfg. Corp., Mishawaka, Ind.
*Earle Gear & Mach. Co., Philadelphia
*Gisholt Machine Co., Madison, Wis.
Hannifin Mfg. Co., Chicago
Hanson Clutch & Mach. Co., Tiffin, O.
*Hendey Machine Co., Torrington, Conn.
Jeffrey Mfg. Co., Columbus, O.
*LeBlond Mach. Tool Co., R. K., Cincinnati
Link-Belt Co., Chicago, Ill.
Medart Co., St. Louis, Mo.
Palmer-Bee Co., Detroit, Mich.
*Rivett Lathe & Grinder Inc., Brighton, Boston
Royersford Foundry & Machine Co., Royersford, Pa.
*Standard Pressed Steel Co., Jenkintown, Pa.
Stephens-Adamson Mfg. Co., Aurora, Ill.
Stow Mfg. Co., Binghamton, N. Y.
*Warner & Swasey Co., Cleveland, O.

COUNTERSINKS (See DRILLS, Twist)

COUNTERS, Revolution & Stroke
Bristol Company, Waterbury, Conn.
*Brown & Sharpe Mfg. Co., Providence, R. I.
Production Instrument Co., Chicago
Scherr Co., Inc., Geo., N. Y. C.
*Starrett Co., The L. S., Athol, Mass.
*Veeder-Root Inc., Hartford, Conn.

COUPLINGS, Hose
Bastian-Blessing Co., Chicago
Binks Mfg. Co., Chicago
Chicago Pneumatic Tool Co., N. Y. C.
Cleveland Pneumatic Tool Co., Cleveland, O.
Crane Co., Chicago, Ill.
DeVilbiss Co., Toledo, O.
Dixon Valve & Coupling Co., Philadelphia
Hunt, C. B., & Son, Salem, O.
Independent Pneumatic Tool Co., Chicago
Ingersoll-Rand Co., N. Y. C.
Knox Mfg. Co., Philadelphia, Pa.
Raybestos-Manhattan Inc., Passaic, N. J.
Schrader's, A., Son, Div. Scovill Mfg. Co., Brooklyn, N. Y.
Stewart-Warner Corp., Chicago
Tite-Flex Metal Hose Co., Newark, N. J.
Worthington Pump & Machy. Corp., Harrison, N. J.

COUPLINGS, Shaft, Flexible
Ajax Flexible Coupling Co., Westfield, N. Y.
*Allis-Chalmers Mfg. Co., Milwaukee, Wis.
Baldwin-Duckworth Chain Corp., Springfield, Mass.
Bartlett Hayward Div., Koppers Co., Baltimore, Md.
Bond Co., Chas., Philadelphia, Pa.
Boston Gear Works, Inc., N. Quincy, Mass.
Certified Flexible Couplings Inc., N. Y. C.
Chain Belt Co., Milwaukee, Wis.
Chicago Rawhide Mfg. Co., Chicago
Continental Diamond Fibre Co., Newark, Del.
*Cullman Wheel Co., Chicago
DeLaval Steam Turbine Co., Trenton, N. J.
*Delta Mfg. Co., Milwaukee, Wis.
Diamond Chain & Mfg. Co., Indianapolis, Ind.
Dodge Mfg. Corp., Mishawaka, Ind.
*Earle Gear & Mach. Co., Philadelphia
Falk Corp., Milwaukee, Wis.
*Farrel-Birmingham Co., Buffalo, N. Y.
*Foote Bros. Gear & Mach. Corp., Chicago, Ill.
Foote Gear Works, Cicero, Ill.
Hill Clutch Mach. & Fdry. Co., Cleveland
Hilliard Corp., Elmira, N. Y.
Jeffrey Mfg. Co., Columbus, O.
Link-Belt Co., Indianapolis, Ind.
Lord Mfg. Co., Erie, Pa.
Lovejoy Flexible Coupling Co., Chicago
Medart Co., St. Louis, Mo.
Mesta Machine Co., Pittsburgh, Pa.
Morse Chain Co., Ithaca, N. Y.
Nicholson & Co., W. H., Wilkes-Barre, Pa.
Palmer-Bee Co., Detroit, Mich.
*Philadelphia Gear Works, Philadelphia
Ramsey Chain Co., Albany, N. Y.
Royersford Foundry & Machine Co., Royersford, Pa.
Stephens-Adamson Mfg. Co., Aurora, Ill.
Whitney Chain & Mfg. Co., Hartford, Conn.

COUPLINGS, Shaft, Non-Flexible
Bond Foundry & Machine Co., Manheim, Pa.
Chain Belt Co., Milwaukee, Wis.
Chicago Pulley & Shafting Co., Chicago
De Laval Steam Turbine Co., Trenton, N. J.
Dodge Manufacturing Corp., Mishawaka, Ind.
Foote Gear Works, Inc., Cicero, Ill.
General Electric Co., Schenectady, N. Y.
*Hill-Acme Co., Cleveland, O.
Hilliard Corp., The, Elmira, N. Y.
Jones, W. A., Fdry. & Mach. Co., Chicago
Link-Belt Co., Ewart Plant, Indianapolis
Medart Co., St. Louis, Mo.
Royersford Foundry & Machine Co., Inc., Royersford, Pa.
*Savage, W. J., Co., Knoxville, Tenn.
Smith & Serrell, Newark, N. J.
Sprout, Waldron & Co., Inc., Muncy, Pa.
*Standard Pressed Steel Co., Jenkintown, Pa.
Stephens-Adamson Mfg. Co., Aurora, Ill.
Waldron, John, Corp., New Brunswick, N. J.
Wood's, T. B., Sons Co., Chambersburg, Pa.

CRANES, Jib
American Mono-Rail Co., Cleveland, O.
Bartlett Snow Co., C. O., Cleveland
Chisholm-Moore Hoist Corp., Tonawanda, N. Y.
Cleveland Crane & Engrg. Co., Wickliffe, O.
Curtis Pneumatic Machy. Co., St. Louis
Electro Lift Inc., N. Y. C.
Harnischfeger Corp., Milwaukee, Wis.
Industrial Brownhoist Corp., Cleveland, O.
Le Tourneau, R. G., Inc., Peoria, Ill.
Link-Belt Speeder Corp., Chicago
Palmer-Bee Co., Detroit, Mich.
Robbins & Meyers, Inc., Hoist & Crane Div., Springfield, O.
Shaw-Box Crane & Hoist Div., Manning, Maxwell & Moore, Inc., Muskegon, Mich.
Shepard Niles Crane and Hoist Corp., Montour Falls, N. Y.
*Wright Mfg. Div., Am. Chain & Cable Co., Inc., York, Pa.
Yale & Towne Mfg. Co., Philadelphia

CRANES, Portable
Canedy-Otto Mfg. Co., Chicago Hgts., Ill.
Chisholm-Moore Hoist Corp., Tonawanda, N. Y.
Electro Lift, Inc., N. Y. C.
Elwell-Parker Electric Co., Cleveland
Lewis-Shepard Sales Corp., Watertown, Mass.
Reading Chain & Block Corp., Reading, Pa.
Shaw-Box Crane & Hoist Div., Manning, Maxwell & Moore, Inc., Muskegon, Mich.
*Wright Mfg. Div., Am. Chain & Cable Co., Inc., York, Pa.
Yale & Towne Mfg. Co., Philadelphia

CRANES, Overhead Traveling
American Mono-Rail Co., Cleveland, O.
Chambersburg Engineering Co., Chambersburg, Pa.
Chisholm-Moore Hoist Corp., Tonawanda, N. Y.
Cleveland Crane & Engrg. Co., Wickliffe, O.
Curtis Pneumatic Machry. Co., St. Louis
Electro Lift Inc., N. Y. C.
Harnischfeger Corp., Milwaukee, Wis.
Industrial Brown Hoist Corp., Cleveland, O.
Morgan Engineering Co., Alliance, Ohio
Northern Engineering Works, Detroit
Palmer-Bee Co., Detroit, Mich.
Shaw-Box Crane & Hoist Div., Manning, Maxwell & Moore, Inc., Muskegon, Mich.
Shepard Niles Crane & Hoist Corp., Montour Falls, N. Y.
Whiting Corp., Harvey, Ill.
*Wright Mfg. Div., Amer. Chain & Cable Co., York, Pa.
Yale & Towne Mfg. Co., Philadelphia

CUPS, Oil & Grease
Alemite Div., Stewart-Warner Corp., Chicago
Bowen Products Corp., Detroit, Mich.
Crane Co., Chicago, Ill.
Detroit Lubricator Co., Detroit, Mich.
Essex Bros. Corp., Detroit, Mich.
Gits Bros. Mfg. Co., Chicago, Ill.
Imperial Brass Mfg. Co., Chicago
Jeffrey Mfg. Co., Columbus, O.
Keystone Lubricating Co., Philadelphia
Link-Belt Co., Indianapolis, Ind.
Lukenheimer Co., Cincinnati, Ohio
Pemberthy Injector Co., Detroit, Mich.
Powell Co., Wm., Cincinnati, Ohio
Scovill Mfg. Co., Waterbury, Conn.
Trico Fuse Mfg. Co., Milwaukee

CUSHIONS, Die
Bliss Co., E. W., Brooklyn, N. Y.
*Dayton Rogers Mfg. Co., Minneapolis, Minn.
Goodrich Co., B. F., Akron, O.
Marquette Tool & Mfg. Co., Toledo, O.
*V. & O. Press Co., Hudson, N. Y.
Verson All-Steel Press Co., Chicago

CUTTERS, Angle
*Barber-Colman Co., Rockford, Ill.
*Brown & Sharpe Mfg. Co., Providence, R. I.
*Butterfield Div., Union Twist Drill Co., Derby Line, Vt.
*Carboloy Co., Detroit, Mich.
Eclipse Counterbore Co., Detroit, Mich.
*Ex-Cell-O Corp., Detroit, Mich.
*Firth-Sterling, McKeesport, Pa.
Gairing Tool Co., Detroit, Mich.
Goddard & Goddard Co., Detroit, Mich.
*Illinois Tool Works, Chicago, Ill.
*Michigan Tool Co., Detroit, Mich.
McCrosky Tool Co., Meadville, Pa.
McKenna Metals, Latrobe, Pa.
Morse Twist Drill & Mach. Co., New Bedford, Mass.
National Tool Co., Cleveland, O.
*National Twist Drill & Tool Co., Detroit, Mich.
*Pratt & Whitney Div. Niles-Bement-Pond Co., Hartford, Conn.
*Scully-Jones & Co., Chicago, Ill.

CUTTERS, Die-Sinking
Detroit Tap & Tool Co., Detroit, Mich.
Eclipse Counterbore Co., Detroit, Mich.
Gairing Tool Co., Detroit, Mich.
*Gorton Machine Co., Geo., Racine, Wis.
Gorham Tool Co., Detroit, Mich.
*Illinois Tool Works, Chicago, Ill.
*Michigan Tool Co., Detroit, Mich.
Morse Twist Drill & Machine Co., New Bedford, Mass.
National Tool Co., Cleveland, Ohio
*National Twist Drill & Tool Co., Detroit
*Pratt & Whitney Div. Niles-Bement-Pond Co., Hartford, Conn.
*Scully-Jones & Co., Chicago
*Tomkins-Johnson Co., Jackson, Mich.
*Union Twist Drill Co., Athol, Mass.

CUTTERS, Formed
*Atkins & Co., E. C., Indianapolis, Ind.
*Barber-Colman Co., Rockford, Ill.
*Brown & Sharpe Mfg. Co., Providence, R. I.
*Carboloy Co., Detroit, Mich.
*Cleveland Twist Drill Co., Cleveland, O.
*Consolidated Machine Tool Corp., Rochester, N. Y.
Detroit Tap & Tool Co., Detroit, Mich.
*Disston & Sons, Inc., Henry, Tacony, Philadelphia

FOR MODERN
METAL CUTTING TOOLS
Specify
NATIONAL
NATIONAL TWIST DRILL & TOOL CO., Detroit, U.S.A.
TWIST DRILLS • REAMERS • HOBS • MILLING CUTTERS • COUNTERBORES • SPECIAL TOOLS
Tap and Die Division WINTER BROTHERS CO., Wrentham, Mass.
Factory Branches • San Francisco • New York • Chicago
Philadelphia • Cleveland • Distributors in Principal Cities

WHERE-TO-BUY DIRECTORY

** Indicates further information to be found in advertising pages.*

CUTTERS, Formed (Cont.)
Eclipse Counterbore Co., Detroit, Mich.
*Ex-Cell-O Corp., Detroit, Mich.
*Firth-Sterling Steel Co., McKeesport, Pa.
Gairing Tool Co., Detroit, Mich.
*Gammons Holman Co., Manchester, Conn.
Goddard & Goddard Co., Detroit
Gorham Tool Co., Detroit, Mich.
Haynes Stellite Co., Kokomo, Ind.
*Illinois Tool Works, Chicago, Ill.
Ingersoll Milling Machine Co., Rockford, Ill.
Kelly Reamer Co., Cleveland, O.
*Michigan Tool Co., Detroit, Mich.
Morrison Machine Products Div., Elmira, N. Y.
Morse Twist Drill & Machine Co., New Bedford, Mass.
National Tool Co., Cleveland, O.
*National Twist Drill & Tool Co., Detroit
*O. K. Tool Co., Shelton, Conn.
*Pratt & Whitney Div. Niles-Bement-Pond Co., Hartford, Conn.
Production Tool Co., Detroit, Mich.
Standard Tool Co., Cleveland, Orio
*Taft Peirce Mfg. Co., Woonsocket, R. I.
*Tomkins Johnson Co., Jackson, Mich.
*Union Twist Drill Co., Athol, Mass.
Wesson Co., Detroit, Mich.

CUTTERS, GEAR
*Adams Co., Dubuque, Iowa
Apex Tool & Cutter Co., Shelton, Conn.
Bantam Ball Bearing Co., South Bend, Ind.
*Barber-Colman Co., Rockford, Ill.
Bilgram Gear & Machine Works, Philadelphia, Pa.
*Brown & Sharpe Mfg. Co., Providence, R. I.
Cleveland Hobbing Mach. Co., Cleveland
Cross Gear & Machine Co., Detroit, Mich.
*Farrel-Birmingham Co., Buffalo, N. Y.
*Fellows Gear Shaper Co., Springfield, Vt.
*General Machinery Corp. (Niles Tool Wks. Div.), Hamilton, O.
*Gleason Works, Rochester, N. Y.
Gould & Eberhardt, Irvington, N. J.
*Illinois Tool Works, Chicago
*Lees-Bradner Co., Cleveland, O.
Link-Belt Co., Philadelphia, Pa.
*Michigan Tool Co., Detroit, Mich.
Morse Tool Co., Detroit, Mich.
Morse Twist Drill & Mach. Co., New Bedford, Mass.
*Natl. Broach & Machine Co., Detroit
National Tool Co., Cleveland, O.
*Natl. Twist Drill & Tool Co., Detroit
*O. K. Tool Co., Shelton, Conn.
*Pratt & Whitney Div. Niles-Bement-Pond Co., Hartford, Conn.
*Producto Machine Co., Bridgeport, Conn.
Scherr Co., Geo., N. Y. C.
Standard Tool Co., Cleveland, O.
Stow Mfg. Co., Inc., Binghamton, N. Y.
Taylor Machine Co., Cleveland, Ohio
*Union Twist Drill Co., Athol, Mass.
*Waltham Machine Works (Small) Waltham, Mass.

CUTTERS, Hand Pipe (See STOCKS, DIES & CUTTERS, Pipe)

CUTTERS, Keyseater
Baker Bros., Inc., Toledo, O.
*Barber-Colman Co., Rockford, Ill.
*Brown & Sharpe Mfg. Co., Providence, R. I.
Colonial Broach Co., Detroit, Mich.
Conn. Broach & Mach. Co., New London, Conn.
*Davis Keyseater Co., Rochester, N. Y.
*Ex-Cell-O Corp., Detroit, Mich.
*Gibraltor Equipment Mfg. Co., St. Louis, Mo.
Goddard & Goddard Co., Detroit
Gorham Tool Co., Detroit, Mich.
*Illinois Tool Works, Chicago
*Michigan Tool Co., Detroit, Mich.
*Mitts & Merrill, Saginaw, Mich.
Morse Twist Drill & Mach. Co., New Bedford, Mass.
Morton Mfg. Co., Muskegon Heights, Mich.
*National Broach & Mach. Co., Detroit
*National Machine Tool Co., Cincinnati
National Tool Co., Cleveland, O.
*National Twist Drill & Tool Co., Detroit, Mich.
*Pratt & Whitney Div. Niles-Bement-Pond Co., Hartford, Conn.
Standard Tool Co., Cleveland, Ohio
*Union Twist Drill Co., Athol, Mass.

CUTTERS, Milling
*Adams Company, Dubuque, Ia.
*Barber-Colman Co., Rockford, Ill.
*Brown & Sharpe Mfg. Co., Providence, R. I.
*Cleveland Twist Drill Co., Cleveland
Colonial Broach Co., Detroit, Mich.
*Consolidated Machine Tool Corp., Rochester, N. Y. (Modern Tool Works)
*Crafts Co., Inc., Arthur A., Boston, Mass.
*Disston, Henry & Sons, Philadelphia, Pa.
Eclipse Counterbore Co., Detroit, Mich.
*Ex-Cell-O Corp., Detroit, Mich.
Fansteel Metallurgical Corp., Chicago
*Firth-Sterling Steel Co., McKeesport, Pa.
Gairing Tool Co., Detroit, Mich.
Gorham Tool Co., Detroit, Mich.
*Gorton Machine Co., George, Racine, Wis.
Haynes Stellite Co., Kokomo, Ind.
*Illinois Tool Works, Chicago
Ingersoll Milling Machine Co., Rockford, Ill.
*Kearney & Trecker Corp., Milwaukee, Wis.
Kelly Reamer Co., Cleveland
Lovejoy Tool Co., Inc., Springfield, Vt.
Machinists Tool Grinding Co., Chicago, Ill.
McCrosky Tool Corp., Meadville, Pa.
McKenna Metals, Latrobe, Pa.
*Michigan Tool Co., Detroit, Mich.
Midwest Tool & Mfg. Co., Detroit
*Modern Tool Works, Div. Consolidated Mach. Tool Corp., Rochester, N. Y.
Morse Tool Co., Detroit, Mich.
Morse Twist Drill & Mach. Co., New Bedford, Mass.
National Tool Co., Cleveland, O.
*Natl. Twist Drill & Tool Co., Detroit
*O. K. Tool Co., Shelton, Conn.
*Pratt & Whitney Div. Niles-Bement-Pond Co., Hartford, Conn.
Production Tool Co., Detroit, Mich.
Putnam Tool Co., Detroit, Mich.
*Scully-Jones & Co., Chicago
Severance Tool Mfg. Co., Saginaw, Mich.
Standard Tool Co., Cleveland, Ohio
Super Tool Co., Detroit, Mich.
*Tomkins-Johnson Co., Jackson, Mich.
*Union Twist Drill Co., Athol, Mass.
*Vascaloy-Ramet Corp., N. Chicago, Ill.
*Waltham Machine Works, Waltham, Mass.
Weldon Tool Co., Cleveland, O.
Wesson Co., Detroit, Mich.
Willey's Carbide Tool Co., Detroit, Mich.
*Williams & Co., J. H., Buffalo, N. Y.

CUTTERS, Wire
Crescent Tool Co., Jamestown, N. Y.
Ideal Commutator Dresser Co., Sycamore, Ill.
Lewis Machine Co., Cleveland, O.
Peck, Stow & Wilcox, Southington, Conn.
Snap-On Tools Corp., Kenosha, Wis.
Shuster Co., F. B., New Haven, Conn.

CUTTING-OFF MACHINES, Abrasive-Wheel
American Instrument Co., Inc., Silver Spring, Md.
Bethlehem Fdry. & Mach. Co., Bethlehem, Pa.
Bridgeport Safety Emery Wheel Co., Bridgeport, Conn.
*Campbell Division, Andrew C. (Amer. Chain & Cable Co.) Bridgeport, Conn.
Catskill Metal Wks., Inc., Catskill, N. Y.
Challenge Machry. Co., Grand Haven, Mich.
*Cincinnati Electrical Tool Co., Cincinnati, O.
Cochrane-Bly Co., Rochester, N. Y.
Crescent Machine Co., Leetonia, Ohio
de Sanno & Sons, Inc., Phoenixville, Pa.
DeWalt Products Corp., Lancaster, Pa.
Mesta Machine Company, Pittsburgh, Pa.
Oliver Machinery Co., Grand Rapids
*Page Steel & Wire Div., Am. Chain & Cable Co., Inc., Monessen, Pa.
*Porter McLeod Machine Tool Co., Inc., Hatfield, Mass.
*Racine Tool & Machine Co., Racine, Wis.
*Standard Electrical Tool Co., Cincinnati, O.
Tabor Mfg. Co., Philadelphia, Pa.
Tannewitz Works, Grand Rapids, Mich.

CYLINDERS, Air (See TANKS & CYLINDERS, Air)

CYLINDERS, Hydraulic (See PRESSES, Hydraulic)

DAMPENERS, Vibration
Armstrong Cork Products Co., Lancaster, Pa.
*Buffalo Forge Co., Buffalo, N. Y.
Felters Co., Inc., Boston, Mass.
Goodrich, B. F., Co., Akron, O.
Goodyear Tire & Rubber Co., Akron, O.
Korfund Co., Inc., L. I. City, N. Y.
Sundt Engrg. Co., Chicago

DEMAGNETIZERS
*Abrasive Machine Tool Co., E. Providence, R. I.
Annis Co., R. B., Indianapolis, Ind.
*Blanchard Machine Co., Cambridge, Mass.
Dickerman Mfg. Co., H. E., Springfield, Mass.
Frampton Electrical Equip. Co., Dayton, O.
*L. W. Chuck Co., Toledo, O.
Martindale Electric Co., Cleveland, O.
*Taft-Peirce Mfg. Co., Woonsocket, R. I.
*Walker Co., O. S., Worcester, Mass.

DIAMONDS, Industrial
*Crafts Co., Inc., Arthur A., Boston, Mass.
Diamond Drill Carbon Co., N. Y. C.
Gilmore & Co., F. F. Boston, Mass.
Hamfen & Co., San Francisco, Cal.
Koebel Diamond Tool Co., Detroit, Mich.
Mogar Industrial Diamond Corp., N. Y. C.
Smit & Co., N. Y. C.
Smit & Sons, Inc., J. K., N. Y. C.

DIE-CASTING MACHINES
*Continental Machine Specialties, Inc., Minneapolis, Minn.
Hannifin Mfg. Co., Chicago, Ill.
Harvill Inc., H. L., Los Angeles, Cal.
Kux-Lohner Machine Co., Chicago, Ill.
Madison-Kipp Corp., Madison, Wis.
Monarch Aluminum Mfg. Co., Cleveland
Phoenix Mach. Co., Cleveland, O.
*Reed-Prentice Corp., Worcester, Mass.
Victor Die Casting Machine Co., Glendale, Cal.

DIE-HEADS, Threading
Aico Tool Co., Bridgeport, Conn.
*Armstrong Bros. Tool Co., Chicago, Ill.
Beaver Pipe Tools Inc., Warren, O.
*Butterfield Div. (Union Twist Drill Co.), Derby Line, Vt.
*Card Mfg. Co., S. W., Mansfield, Mass.
*Consolidated Machine Tool Corp. (Modern Tool Works), Rochester, N. Y.
*Eastern Machine Screw Corp., New Haven, Conn.
*Errington Mech. Lab., Stapleton, N. Y.
*Geometric Tool Co., New Haven, Conn.
Gerstner & Sons, H., Dayton, O.
Greenfield Tap and Die Corp., Greenfield, Mass.
*Hill-Acme Co., Cleveland, O.
*Jones & Lamson Machine Co., Springfield, Vt.
*Landis Machine Co., Waynesboro, Pa.
Morse Twist Drill & Mach. Co., New Bedford, Mass.
*Murchey Machine & Tool Co., Detroit
*National Acme Co., Cleveland, O.
National Machry. Co., Tiffin, O.
*Oster Mfg. Co., Cleveland, O.
Pipe Machinery Co., Cleveland, O.
*Pratt & Whitney Div. Niles-Bement-Pond Co., Hartford, Conn.
Rickert-Shafer Co., Erie, Pa.
Standard Tool Co., Cleveland, O.
*Union Twist Drill Co., Athol, Mass.
*Warner & Swasey Co., Cleveland, O.
*Winter Bros. Co., Wrentham, Mass.

DIE-MAKERS' SUPPLIES
*Baumbach Mfg. Co., E. A. Chicago
*Brown & Sharpe Mfg. Co., Providence, R. I.
*Carboloy Co., Inc., Detroit, Mich.
*Cunningham Co., M. E., Pittsburgh, Pa.
*Danly Mach. Specialties, Inc., Chicago
Detroit Stamping Co., Detroit, Mich.
*Dykem Co., St. Louis, Mo.
Ford Motor Co., Johannson Div., Dearborn, Mich.
*Producto Machine Co., Bridgeport, Conn.
U. S. Tool Co., Ampere, N. J.

DIE-MAKING & CUTTING MACHINES
Brickner-Kropf Mach. Co., Muskegon Hgts., Mich.
*Cincinnati Milling Machine Co., Cincinnati, O.
Cochrane-Bly Co., Rochester, N. Y.
*Continental Mach. Spec., Inc., Minneapolis, Minn.
Foley Mfg. Co., Inc., Minneapolis, Minn.
*Gorton Machine Co., Geo., Racine, Wis.
Grob Bros., Grafton, Wis.
Hack Machine Co., Chicago
*Harvey Mfg. Corp., N. Y. C.
*Illinois Tool Works, Chicago
Ingersoll Milling Mach. Co., Rockford, Ill.
Jarvis Co., Chas. L., Middletown, Conn.
*Johnson Tool Co., E. Providence, R. I.
Marburg Bros., Inc., N. Y. C.
*Oliver Machinery Co., Grand Rapids, Mich.
*Pratt & Whitney Div. Niles-Bement-Pond Co., Hartford, Conn.
*Reed-Prentice Co., Worcester, Mass.

DIE-SETS
*Baumbach Mfg. Co., E. A., Chicago
*Card Mfg. Co., S. W. (Div. Union Twist Drill), Mansfield, Mass.
*Danly Mach. Specialties, Inc., Chicago
Morse Twist Drill & Machine Co., New Bedford, Mass.
*Pratt & Whitney Div. Niles-Bement-Pond Co., Hartford, Conn.
U. S. Tool Co., Inc., Ampere, N. J.

DIE-SINKING MACHINES
Billings & Spencer Co., Hartford, Conn.
*Cincinnati Milling Machine Co., Cincinnati
*Gorton Machine Co., George, Racine, Wis.
Heim Co., Fairfield, Conn
*Pratt & Whitney Div. Niles-Bement-Pond Co., Hartford, Conn.
Preis Engraving Mach. Co., H. P., Newark, N. J.
*Producto Machine Co., Bridgeport, Conn.
*Reed-Prentice Corp., Worcester, Mass.

DIES, Marking & Embossing
Acromark Co., Elizabeth, N. J.
Dickey-Grabler Co., Cleveland, O.
Everhot Mfg. Co., Maywood, Ill.
Hanson, C. H. Co., Chicago
Markwell Products Co., Kansas City, Mo.
Matthews, Jas. H. & Co., Pittsburgh
New Method Steel Stamps, Inc., Detroit
*Noble & Westbrook Mfg. Co., East Hartford, Conn.
Pannier Bros. Stamp Co., Pittsburgh
Schwerdtle Stamp Co., Bridgeport, Conn.
Spencer, S. M., Mfg. Co., Boston, Mass.

DIES, Screw-Cutting, Adjustable
Alvord-Polk Tool Co., Millersburg, Pa.
Armstrong Co., Bridgeport, Conn.
Brubaker, W. L., & Bros. Co., Millersburg, Pa.
*Butterfield & Co., Div. Union Twist Drill Co., Derby Line, Vt.
*Card, S. W. Mfg. Co., Div. Union Twist Drill Co., Mansfield, Mass.
Champion Blower Forge Co., Lancaster, Pa.
*Geometric Tool Co., New Haven, Conn.
Greenfield Tap & Die Corp., Greenfield, Mass.
*Jones & Lamson Machine Co., Springfield, Vt.
*Landis Machine Co., Waynesboro, Pa.
Mayhew Steel Products, Inc., Shelburne Falls, Mass.
*Modern Tool Wks., Div. of Consol. Mach. Tool Corp. of Am., Rochester, N. Y.

DIE HEADS Self-Opening **TAPS** Collapsible

THREADING MACHINES

MURCHEY MACHINE & TOOL CO.

951 Porter St. Detroit, Mich.

WHERE-TO-BUY DIRECTORY

** Indicates further information to be found in advertising pages.*

Morse Twist Drill & Machine Co., New Bedford, Mass.
*Murchey Machine & Tool Co., Detroit
*National Acme Co., Cleveland, O.
Rickert-Shafer Co., Erie, Pa.
Threadwell Tap & Die Co., Greenfield, Mass.
Whitman & Barnes, Detroit
*Winter Brothers Co., Wrentham, Mass.

DIES, Sheet-Metal & Forging
Brown, R. H., & Co., New Haven, Conn.
City Machine & Tool Co., Toledo, O.
Corley Mfg. Co., Chattanooga, Tenn.

Finkl & Sons, Co., A., Chicago
*Gibraltar Equipt. & Mfg. Co., St. Louis
Globe Machine & Stamping Co., Cleveland, O.
*Hamilton Tool Co., Hamilton, O.
*Huot Mfg. Co., St. Paul, Minn.
Marchant, Geo. F., Co., Chicago
National Machine Co., Racine, Wis.
Northern Specialty Co., Utica, N. Y.
Quickwork-Whiting Corp., Harvey, Ill.
Robinson Mfg. Co., Waterbury, Conn.
Rock River Mach. Co., Janesville, Wis.
*Scully-Jones & Co., Tool Div., Chicago
*Taft-Peirce Mfg. Co., Woonsocket, R. I.
Toledo Pressed Steel Co., Toledo, O.
U. S. Tool Co., Ampere, N. J.
*Veeder-Root, Inc., Hartford, Conn.
Whitney Metal Tool Co., Rockford, Ill.
Wrought Washer Mfg. Co., Milwaukee

DIES, Solid Bolt & Pipe
*Armstrong Bros. Tool Co., Chicago
Bath & Co., John, Worcester, Mass.
Beaver Pipe Tools, Inc., Warren, O.
*Butterfield Div. (Union Twist Drill Co.), Derby Line, Vt.
*Card Mfg. Co., S. W., Mansfield, Mass.
*Consolidated Machine Tool Corp., Rochester, N. Y.
*Geometric Tool Co., New Haven, Conn.
Greenfield Tap & Die Corp., Greenfield, Mass.
Morse Twist Drill & Machine Co., New Bedford, Mass.
*Oster Mfg. Co., Cleveland, Ohio
*Pratt & Whitney Div. Niles-Bement-Pond Co., Hartford, Conn.
Rickert-Shafer Co., Erie, Pa.
U. S. Tool Co., Inc., Ampere, N. J.
Whitman & Barnes, Detroit
*Winter Bros. Wrentham, Mass.

DIES, Sub-Press
*Baumbach Mfg. Co., E. A., Chicago
*Producto Machine Co., Bridgeport, Conn.
U. S. Tool Co., Inc., Ampere, N. J.
*V & O Press Co., Hudson, N. Y.
Verson Allsteel Press Co., Chicago
*Waltham Machine Works, Waltham, Mass.
Whistler & Sons., S. B., Buffalo, N. Y.

DIES, Wire-Drawing & Extrusion
Ampco Metal Co., Milwaukee, Wis.
Bliss Co., E. W., Brooklyn, N. Y.
*Carboloy Co., Detroit, Mich.
Cerro de Pasco Copper Corp., N. Y. C.
*Crafts Co., Arthur A., Boston, Mass.
Driver-Harris Co., Harrison, N. J.
*Firth-Sterling Steel Co., McKeesport, Pa.
*Illinois Tool Works, Chicago
*Metal Carbides Corp., Youngstown, O.
*Taft-Peirce Mfg. Co., Woonsocket, R. I.

DISKS, Abrasive (See WHEELS, Grinding & Polishing)

DISKS, Circular Cutting
*Atkins, E. C., & Co., Indianapolis, Ind.
*Disston & Sons, Inc., Henry, Tacony, Philadelphia
Morse Twist Drill and Machine Co., New Bedford, Mass.

DIVIDERS (See CALIPERS & COMPASSES)

DOGS, Lathe & Milling-Machine
*Armstrong Bros. Tool Co., Chicago
Billings & Spencer Co., Hartford, Conn.
Bonney Forge & Tool Works, Allentown, Pa.
Chicago Tool & Engrg. Co., Chicago
*Cincinnati Lathe & Tool Co., Oakley, Cincinnati
Colmar Bros., South Bend, Ind.
*Hendey Machine Co., Torrington, Conn.
*LeBlond Machine Tool Co., R. K., Cincinnati
*Ready Tool Co., Bridgeport, Conn.
*Williams & Co., J. H., Buffalo, N. Y.

DRAFTING-ROOM SUPPLIES
Bartusch, A. P., Lockport, N. Y.
Bruning Co. Inc., Chas., N. Y. C.
Curtis 1000 Inc., St. Paul, Minn.
Dietzgen Co., Eugene, Chicago
Dixon Crucible Co., Jos., Jersey City, N. J.
Drafto Co., Cochranton, Pa.
Emmert Mfg. Co., Waynesboro, Pa.
Eraser Company, Inc., Syracuse, N. Y.
Faber Co., A. W., Newark, N. J.
Faber Pencil Co., Eberhard, Brooklyn, N. Y.
Hamilton Mfg. Co., Two Rivers, Wis.
Holliston Mills, Inc., Norwood, Mass.
Keuffel & Esser Co., Hoboken, N. J.
Ozalid Corp., N. Y. C.
Paragon-Revolute Corp., Rochester, N. Y.
Pease Co., C. F., Chicago
Post Co., Frederick, Chicago
Universal Drafting Mach. Co., Cleveland
Wade Instrument Co., Cleveland, O.
Wood-Regan Inst. Co., Nutley, N. J.
Wickes Bros., Saginaw, Mich.
Wright Inc., L. G., Cleveland, O.

DRESSERS, Grinding Wheel
Abrasive Dressing Tool Co., Detroit
*American Swiss File & Tool Co., Elizabeth, N. J.
*Atkins & Co., E. C., Indianapolis, Ind.
*Black & Decker Mfg. Co., Towson, Md.
Calder Mfg. Co., Lancaster, Pa.
*Carboloy Co., Detroit, Mich.
Carborundum Co., Niagara Falls, N. Y.
Chicago Wheel & Mfg. Co., Chicago
*Crafts Co., Arthur A., Boston, Mass.
Colmar Bros., South Bend, Ind.
*Desmond-Stephan Mfg. Co., Urbana, Ohio
*Disston & Sons, Inc., Henry, Tacony, Philadelphia
*Dumore Co., Racine, Wis.
Gilmore & Co., F. F., Boston, Mass.
Hanchett Mfg. Co., Big Rapids, Mich.
Ideal Commutator Dresser Co., 1057 Park Ave., Sycamore, Ill.
Karelsen, Inc., E., N. Y. C.
Kershaw, F. A., Kent, Ohio
Koebel Diamond Tool Co., Detroit, Mich.
Lee & Son Co., K. O., Aberdeen, S. D.
*Metal Carbides Corp., Youngstown, O.
*Norton Co., Worcester, Mass.
Smit & Co., Anton, N. Y. C.
Smit & Sons, J. K., N. Y. C.
Standard Tool Co., Cleveland, Ohio
Stanley Elec. Tool Div. of Stanley Works, New Britain, Conn.
U. S. Tool Co., Inc., Ampere, N. J.
Vincent Steel Process Co., Detroit
Vinco Tool Co., Detroit, Mich.
Western Tool & Mfg. Co., Springfield, O.
Willeys Carbide Tool Co., Detroit

DRESSING, Belt
American Asphalt Paint Co., Chicago
American Belting Co's., Baltimore, Md.
Bond Co., Chas., Philadelphia
Chicago Belting Co., Chicago
Cling-Surface Co., Buffalo, N. Y.
Dixon Crucible Co., Jersey City, N. J.
Goodrich, B. F., Co., Akron, O.
Graton & Knight Co., Worcester, Mass.
Hanchett Mfg. Co., Big Rapids, Mich.
Houghton & Co., E. F., Phila., Pa.
Rhoads, J. E., & Sons, Philadelphia
Standard Oil Co. of Calif., San Francisco, Cal.
Tide Water Associated Oil Co., N. Y. C.
White & Bagley, Worcester, Mass.

DRIERS, Centrifugal
Barrett Co., Leon J., Worcester, Mass.
*DeLaval Separator Co., Poughkeepsie, N. Y.
Rochester Engrg. & Centrifugal Corp., Rochester, N. Y.
*Tolhurst Centrifugal Div., Am. Mach. & Metals Co., E. Moline, Ill.

DRIFTS, Drill
*Armstrong Bros. Tool Co., Chicago
*Cleveland Twist Drill Co., Cleveland
Morse Twist Drill & Machine Co., New Bedford, Mass.
Standard Tool Co., Cleveland
*Williams, J. H., & Co., N. Y. C.

DRILL RACKS
*Huot Mfg. Co., St. Paul, Minn.

DRILLROD, Steel Tool (See STEEL, Tool)

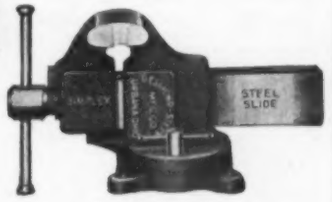
DRILLS, Automatic & Semi-Automatic
Allen Co., Chas. G., Barre, Mass.
*Avey Drilling Machine Co., Cincinnati
Baker Bros., Inc., Toledo, O.
*Barnes Co., W. F. & John, Rockford, Ill.
*Barnes Drill Co., Rockford, Ill.
Bodine Corp., Bridgeport, Conn.
*Bradford Machine Tool Co., Cincinnati
*Buffalo Forge Co., Buffalo, N. Y.
Buhr Machine Tool Co., Ann Arbor, Mich.

DESMOND
GRINDING WHEEL DRESSERS

We manufacture the only complete line of Dressers and Cutters and will be pleased to advise the proper one for your wheels.

Write for copy of our catalog and name of your nearest dealer.

SIMPLEX
STEEL SLIDE VISES



The exclusive solid steel slide makes these vises stronger and more serviceable.

Write for complete vise catalog and name of your nearest dealer.

THE DESMOND-STEPHAN MFG. CO.
URBANA, OHIO
Canadian Desmond-Stephan Mfg. Co., Ltd., Hamilton, Ont.

BAUMBACH
STANDARDIZED
DIE SETS

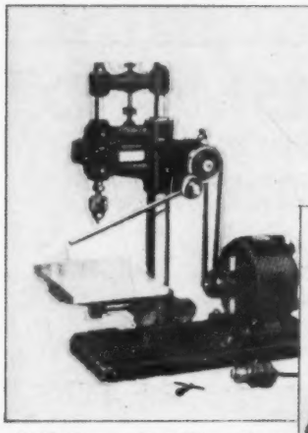
BETTER-MADE
DIE SETS
AT LOWER COST
46 Styles—195,000 Sizes
Machined Steel Drop Forged Steel Semi Steel
Send for our new 336 page catalog
E. A. BAUMBACH MFG. CO.
1812 South Kilbourn Ave., Chicago, Ill.

Carbide and Diamond-tipped
GAGES AND TOOLS
GUARANTEED QUALITY
ARTHUR A. *Crafts* COMPANY, INC.
Chicago 532 COMMONWEALTH AVE. *Detroit*
Boston

HAMILTON DRILLING MACHINES

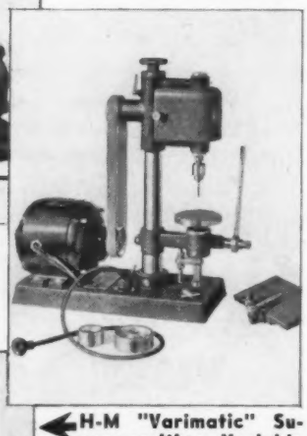
A CHALLENGE TO OBSOLESCENCE

Hamilton Drilling Machines are the "World's standard for small hole drilling and tapping." You'll find them wherever high precision and accurate high precision work is demanded. Widely preferred by manufacturers of aircraft parts, diesel engines, cameras, instruments, watches, tools, gages and many other products. Yours, too, for better workmanship!



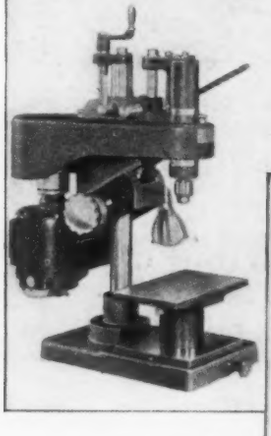
A-M Super Sensitive Drilling Machine #2

Horizontal work capacity to the center of 6½". Vertical work capacity to 4". Drilling capacity .004 to 3/16". Possible spindle speeds 788 to 8500 R.P.M.



H-M Super Sensitive Tapping Machine

Horizontal work capacity to the center of 6½". Vertical work cap. 3½". Tapping cap. 0-3/16". Spindle speeds 1166, 1400, 1458, 1750, 2100, 2187, 2625.



H-M "Varimatic" Super-sensitive Variable Speed Drilling Machine

Horizontal work capacity to the center of 10". Vertical work capacity 14". Drilling cap. .004 to 5/16" in all materials. Possible spindle speeds 840 to 9,300 RPM.

H-M Maxi-Jr. E. Super Sensitive Drilling Machine

Horizontal work capacity to the center of 10". Vertical work capacity 10". Drilling capacity .004 to ¼" in all materials. Possible spindle speeds 1,000 to 12,000 R.P.M.

The HAMILTON TOOL CO.

HAMILTON . . . . . OHIO

WHERE-TO-BUY DIRECTORY

DRILLS, Auto. & Semi-Auto. (Cont.)
Canedy-Otto Mfg. Co., Chicago Hgts., Ill.
*Cincinnati-Gilbert Machine Tool Co., Cincinnati, O.
*Cleereman Machine Tool Co., Green Bay, Wis.
*Consolidated Mach. Tool Corp., Rochester, N. Y.
Cross Gear and Machine Co., Detroit
Davenport Machine Tool Co., Rochester, N. Y.
*Davis-Thompson Co., Milwaukee, Wis.
Defiance Machine Works, Defiance, O.
*Ex-Cell-O Corp., Detroit, Mich.
Foote-Burt Co., Cleveland, Ohio.
*Fosdick Machine Tool Co., Cincinnati, O.
Fox Machine Co., Jackson, Mich.
*Goss & deLeeuw Machine Co., New Britain, Conn.
Greenlee Bros. & Co., Rockford, Ill.
Ingersoll Milling Machine Co., Rockford, Ill.
*Kingsbury Machine Tool Co., Keene, N. H.
Langelier Mfg. Co., Providence, R. I.
*Leland-Gifford Co., Worcester, Mass.
*Moline Tool Co., Moline, Ill.
National Automatic Tool Co., Richmond, Ind.
North Bros. Mfg. Co., Philadelphia, Pa.
*Pratt & Whitney Div. Niles-Bement-Pond Co., Hartford, Conn.
Rockford Drilling Machine Co., Rockford, Ill.
Royersford Fdry. & Mach. Co., Inc., Royersford, Pa.
*Snyder Tool & Engrg. Co., Detroit, Mich.
*Sundstrand Machine Tool Co., Rockford, Ill.
Taylor & Fenn Co., Hartford, Conn.

DRILLS, Bench
Allen Co., Chas. G., Barre, Mass.
Atlas Press Co., Kalamazoo, Mich.
Automatic Machine Co., Bridgeport, Conn.
*Avey Drilling Machine Co., Cincinnati
*Barnes Co., W. F. & John, Rockford, Ill.
*Billstrom, Inc., Nels J., Rockford, Ill.
*Black & Decker Mfg. Co., Towson, Md.
*Buffalo Forge Co., Buffalo, N. Y.
Buhr Machine Tool Co., Ann Arbor, Mich.
Canedy-Otto Mfg. Co., Chicago Hgts., Ill.
Champion Blower & Forge Co., Harrisburg Ave., Lancaster, Pa.
*Cincinnati Bickford Tool Co., Oakley, Cincinnati, O.
*Cincinnati Electrical Tool Co., Cincinnati, O.
Clark, Jas. Jr., Electric Co., Louisville, Ky.
*Delta Mfg. Co., Milwaukee, Wis.
*Dumore Co., Racine, Wis.
Edlund Machine Co., Cortland, N. Y.
Foote-Burt Co., Cleveland, O.
*Fosdick Machine Tool Co., Cincinnati, O.
*Hamilton Tool Co., Hamilton, O.
*Henry & Wright Mfg. Co., Hartford, Conn.
High Speed Hammer Co., Inc., Rochester, N. Y.
Langelier Mfg. Co., Cranston, R. I.
*Leland-Gifford Co., Worcester, Mass.
*Moline Tool Co., Moline, Ill.
Munding Mfg. Co., Glendale, Cal.
North Bros. Mfg. Co., Philadelphia, Pa.
*Pratt & Whitney Div. Niles-Bement-Pond Co., Hartford, Conn.
Production Machine Co., Greenfield, Mass.
Rockford Drilling Machine Co., Rockford, Ill.
Reed, Francis Co., Greenfield, Mass.
Royersford Fdry. & Mach. Co., Inc., Royersford, Pa.
*Ryerson & Son, Jos. T., Chicago
Schauer Mach. Co., Cincinnati, O.
Skilsaw, Inc., Chicago
Standard Electrical Tool Co., Cincinnati, Ohio.
Stanley Electrical Tool Div., Stanley Wks., New Britain, Conn.
Taylor & Fenn Co., Hartford, Conn.
Taylor Mfg. Corp., Milwaukee, Wis.
U. S. Electrical Tool Co., Cincinnati, O.
U. S. Automatic Box Machry. Co., Roslindale, Mass.
Van Dorn Elec. Tool Co., Towson, Md.
*Walker-Turner Co., Plainfield, N. J.

DRILLS, Breast (See TOOLS, Hand)

DRILLS, Center
*Cleveland Twist Drill Co., Cleveland, O.
*Firth-Sterling Steel Co., McKeesport, Pa.
Greenfield Tap & Die Corp., Greenfield, Mass.
Morse Twist Drill and Machine Co., New Bedford, Mass.
*Natl. Twist Drill & Tool Co., Detroit
*Pratt & Whitney Co., Div., Niles Bement-Pond Co., Hartford, Conn.
*Slocomb Co., J. T., Providence, R. I.
Standard Tool Co., Cleveland, O.
Super Tool Company, Detroit, Mich.
*Union Twist Drill Co., Athol, Mass.
Victor Machinery Exchange, New York, N. Y.
Whitman & Barnes, Detroit, Mich.

DRILLS, Column-Type
Allen Co., Chas. G., Barre, Mass.
Baker Bros. Inc., Toledo, O.
*Barnes Drill Co., Rockford, Ill.
*Barnes Co., W. F. & John, Rockford, Ill.
*Billstrom, Inc., Nels J., Rockford, Ill.
*Buffalo Forge Co., Buffalo, N. Y.
*Cincinnati-Bickford Tool Co., Oakley, Cincinnati, O.
*Cleereman Machine Tool Co., Chicago.
*Cincinnati-Gilbert Machine Tool Co., Cincinnati, O.
*Consolidated Machine Tool Corp., Rochester, N. Y.
*Davis & Thompson Co., Milwaukee, Wis.
Defiance Machine Works, Defiance, O.
Edlund Machine Co., Cortland, N. Y.
Foote-Burt Co., Cleveland, O.
*Fosdick Machine Tool Co., Cincinnati, O.
*General Machinery Corp. (Niles Tool Works Div.), Hamilton, O.
Ingersoll Milling Machine Co., Rockford, Ill.
*Leland-Gifford Co., Worcester, Mass.
*LeMaire Tool & Mfg. Co., Dearborn, Mich.
*Moline Tool Co., Moline, Ill.
National Automatic Tool Co., Richmond, Ind.
Rockford Drilling Machine Co., Rockford, Ill.
Royersford Fdry. & Mach. Co., Inc., Royersford, Pa.
*Snyder Tool & Engrg. Co., Detroit, Mich.

DRILLS, Core
*Carboloy Co., Detroit, Mich.
Eclipse Counterbore Co., Detroit, Mich.
*Ex-Cell-O Corp., Detroit, Mich.
*Firth-Sterling Steel Co., McKeesport, Pa.
Gairing Tool Co., Detroit, Mich.
Gorham Tool Co., Detroit, Mich.
Haynes Stellite Co., Kokomo, Ind.
Morse Twist Drill & Machine Co., New Bedford, Mass.
*Natl. Twist Drill & Tool Co., Detroit
Production Tool Co., Detroit, Mich.
Putnam Tool Co., Detroit
*Scully-Jones & Co., Chicago
Standard Tool Co., Cleveland, O.
Super Tool Company, Detroit, Mich.
*Union Twist Drill Co., Athol, Mass.
Wesson Co., Detroit, Mich.
Whitman & Barnes, Detroit, Mich.

DRILLS, Flat (See DRILLS, Twist & Flat)

DRILLS, Hand (See TOOLS, Hand)

DRILLS, Horizontal
Allen Co., Chas. G., Barre, Mass.
*Avey Drilling Machine Co., Cincinnati
Baird Machine Co., Bridgeport, Conn.
Baker Bros. Inc., Toledo, Ohio

KEEP YOUR DRILLS IN A

DRILL-INDEX

MADE LIKE A CARD INDEX

A Flip of Wrist Opens or Closes
Made in Six Sizes

ASK YOUR DEALER OR WRITE TO
HUOT MFG. CO 128 East Tenth Street, ST. PAUL, MINN.

WHERE-TO-BUY DIRECTORY

*Barnes Co., W. F. & John, Rockford, Ill.
*Bradford Machine Tool Co., Cincinnati
Buhr Machine Tool Co., Ann Arbor, Mich.
*Cincinnati-Gilbert Machine Tool Co., Cincinnati
*Consolidated Machine Tool Corp., Rochester, N. Y.
Defiance Machine Works, Defiance, O.
Foote-Burt Co., Cleveland, O.
*Fosdick Machine Tool Co., Cincinnati, O.
Fox Machine Co., Jackson, Mich.
Frew Machine Co., Philadelphia, Pa.
*General Machinery Corp. (Niles Tool Works Div.), Hamilton, O.
*Giddings & Lewis Machine Tool Co., Fond du Lac, Wis.
Hole Engrg. Service, Detroit, Mich.
Ingersoll Milling Machine Co., Rockford, Ill.
*Kingsbury Machine Tool Co., Keene, N. H.
Langelier Mfg. Co., Providence, R. I.
*Leland-Gifford Co., Worcester, Mass.
*Moline Tool Co., Moline, Ill.
*Murchey Machine and Tool Co., Detroit
National Automatic Tool Co., Richmond, Ind.
Partool Mach. Co., Detroit, Mich.
Rockford Drilling Machine Co., Rockford, Ill.
*Ryerson & Son, Jos. T., Chicago
*Sellers & Co., Inc., Wm., Philadelphia
*Snyder Tool & Engrg. Co., Detroit, Mich.
Universal Boring Machine Co., Hudson, Mass.

DRILLS, Multi-Spindle or Gang

Allen Co., Chas. G., Barre, Mass.
Automatic Machine Co., Bridgeport, Conn.
*Avey Drilling Machine Co., Cincinnati, O.
Baker Bros. Inc., Toledo, O.
Baird Machine Co., Bridgeport, Conn.
*Barnes Co., W. F. & John, Rockford, Ill.
*Barnes Drill Co., Rockford, Ill.
Bodine Corp., Bridgeport, Conn.
*Bradford Machine Tool Co., Cincinnati
*Buffalo Forge Co., Buffalo, N. Y.
Buhr Machine Tool Co., Ann Arbor, Mich.
Canedy-Otto Mfg. Co., Chicago Hgts., Ill.
Champion Blower & Forge Co., Harrisburg Ave., Lancaster, Pa.
*Cincinnati Bickford Tool Co., Oakley, Cincinnati, O.
*Cleereman Mach. Tool Co., Green Bay, Wis.
*Consolidated Machine Tool Corp., Rochester, N. Y.
*Davis & Thompson Co., Milwaukee, Wis.
Defiance Machine Works, Defiance, O.
*Delta Mfg. Co., Milwaukee, Wis.
*Ex-Cell-O Corp., Detroit, Mich.
Foote-Burt Co., Cleveland, O.
*Fosdick Machine Tool Co., Cincinnati, O.
Fox Machine Co., Jackson, Mich.
*General Machinery Corp. (Niles Tool Works Div.), Hamilton, O.
*Grant Mfg. and Machine Co., Bridgeport, Conn.
Greenlee Bros. & Co., Rockford, Ill.
*Hamilton Tool Co., Hamilton, O.
*Henry & Wright Mfg. Co., Hartford, Conn.
High Speed Hammer Co., Inc., Rochester, N. Y.
Hoefer Mfg. Co., Freeport, Ill.
Index Machinery Corp., Cincinnati, O.
Ingersoll Milling Machine Co., Rockford, Ill.
*Kingsbury Machine Tool Co., Keene, N. H.
Langelier Mfg. Co., Providence, R. I.
*Leland-Gifford Co., Worcester, Mass.
*Moline Tool Co., Moline, Ill.
National Automatic Tool Co., Richmond, Ind. (Turret type also).
Partool Mach. Co., Detroit, Mich.
*Pratt & Whitney Div. Niles-Bement-Pond Co., Hartford, Conn.
Production Machine Co., Greenfield, Conn.
Rockford Drilling Machine Div., Borg-Warner Corp., Rockford, Ill.
Royersford Fdry. & Mach. Co., Inc., Royersford, Pa.
Scherr Co., Geo., N. Y. C.
Sigourney Tool Co., Hartford, Conn.
*Snyder Tool & Engrg. Co., Detroit, Mich.
Taylor & Fenn Co., Hartford, Conn.
Thomas Machine Mfg. Co., Pittsburgh

DRILLS, Portable Electric (See TOOLS, Portable Electric)

DRILLS, Portable Pneumatic (See TOOLS, Portable Pneumatic)

DRILLS, Radial

*American Tool Works Co., Cincinnati, O.
*Carlton Machine Co., Cincinnati, O.
*Cincinnati Bickford Tool Co., Oakley, Cincinnati, O.
*Cincinnati-Gilbert Machine Tool Co., Cincinnati, O.
*Cleveland Punch & Shear Works, Inc., Cleveland, Ohio
*Fosdick Machine Tool Co., Cincinnati, O.
*General Machinery Corp. (Niles Tool Works Div.), Hamilton, O.
Hammond Mfg. Co., Cleveland, O.
Heller Machine Co., N. Y. C.
*Leland-Gifford Co., Worcester, Mass.
Morris Machine Tool Co., Cincinnati, O.
Western Machine Tool Works, Holland, Mich.

DRILLS, Sensitive

Allen Co., Chas. G., Barre, Mass.
Atlas Press Co., Kalamazoo, Mich.
*Avey Drilling Machine Co., Cincinnati, O.
*Billstrom, Inc., Nels J., Rockford, Ill.
Boice-Crane Co., Toledo, Ohio
*Buffalo Forge Co., Buffalo, N. Y.
Buhr Mach. Tool Co., Ann Arbor, Mich.
Canedy-Otto Mfg. Co., Chicago Hgts., Ill.
Champion Blower & Forge Co., Lancaster, Pa.
Clark Jr. Elec. Co., James, Louisville, Ky.
*Cleereman Machine Tool Co., Chicago
Cosa Oversea Trading Corp., New York, N. Y.
*Delta Mfg. Co., Milwaukee, Wis.
*Dumore Co., Racine, Wis.
Foote-Burt Co., Cleveland, O.
*Fosdick Machine Tool Co., Cincinnati, O.
*Hamilton Tool Co., Hamilton, O.
*Henry & Wright Mfg. Co., Hartford, Conn.
High Speed Hammer Co., Inc., Rochester, N. Y.
*Kingsbury Mach. Tool Corp., Keene, N. H.
Langelier Mfg. Co., Providence, R. I.
*Leland-Gifford Co., Worcester, Mass.
National Automatic Tool Co., Richmond, Ind.
Partool Mach. Co., Detroit, Mich.
*Pratt & Whitney Div. Niles-Bement-Pond Co., Hartford, Conn.
Production Machine Co., Greenfield, Mass.
Royersford Fdry. & Mach. Co., Royersford, Pa.
Scherr Co., Geo., N. Y. C.
Sigourney Tool Co., Hartford, Conn.
Stark Tool Co., Waltham, Mass.
Taylor & Fenn Co., Hartford, Conn.
Taylor Mfg. Corp., Milwaukee, Wis.
Toledo General Mfg. Co., Toledo, O.
U. S. Automatic Box Machry. Co., Roslindale, Mass.
*Walker-Turner Co., Inc., Plainfield, N. J.

DRILLS, Twist & Flat

American Twist Drill & Tool Co., Detroit
*Carboloy Co., Detroit, Mich.
*Cleveland Twist Drill Co., Cleveland
Cogsdill Twist Drill Co., Inc., Detroit
*Firth-Sterling Steel Co., McKeesport, Pa.

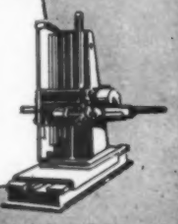
THE REDIN
SENSITIVE PRECISION DRILL

Critical Machinery Buyers will find in this machine all the features of drilling economy, whether used on high speed production work or painstakingly accurate tool room jobs.

Manufactured by
NELS J. BILLSTROM INC.
ROCKFORD ILLINOIS

GILBERT

PRODUCTION SPEEDING RADIAL DRILLS AND HORIZONTAL DRILLING, BORING AND MILLING MACHINES

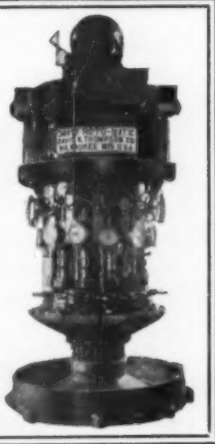


DETAILS ON REQUEST

THE CINCINNATI GILBERT MACHINE TOOL CO.
CINCINNATI, OHIO

DAVIS
ROTO-MATIC

A continuous multiple spindle drilling machine for high production on moderate as well as large quantities.



DAVIS & THOMPSON COMPANY
6619 W. Mitchell St., Milwaukee, Wis.

Drilling and Tapping Machines
(Automatic and Semi-Automatic)
LELAND GIFFORD CO.
WORCESTER, MASS.

WHERE-TO-BUY DIRECTORY

** Indicates further information to be found in advertising pages.*

DRILLS, Twist & Flat (Cont.)
Greenfield Tap & Die Corp., Greenfield, Mass.
*Grobet File Corp. of Amer., N. Y. C.
Morse Tool Co., Detroit, Mich.
Morse Twist Drill & Machine Co., New Bedford, Mass.
*National Twist Drill & Tool Co., Detroit.
*Pratt & Whitney Div. Niles-Bement-Pond Co., Hartford, Conn.
*Scully-Jones & Co., Chicago, Ill.
Standard Tool Co., Cleveland, O.
*Union Twist Drill Co., Athol, Mass.
*Victor Machinery Exchange, New York, N. Y.
Wesson Co., Detroit, Mich.
Whitman & Barnes, Detroit, Mich.

DRIVES, Machine
Atlas Press Co., Kalamazoo, Mich.
*Cincinnati Lathe & Tool Co., Oakley, Cincinnati
Cleveland Electric Motor Co., Cleveland
*Cullman Wheel Co., Chicago
Dayton Rubber Mfg. Co., Dayton, O.
Drive-All Mfg. Co., Detroit, Mich.
*Hardinge Brothers, Inc., Elmira, N. Y.
Lima Armature Works, Lima, O.
Master Electric Co., Dayton, O.
*Reed-Prentice Co., Worcester, Mass.
*Reliance Elec. & Engrg. Co., Cleveland
Remco Products Corp., York, Pa.
*Rivett Lathe & Grinder Inc., Brighton, Boston
Sebastian Lathe Co., Cincinnati, O.
Sheldon Mach. Co., Chicago
Stark Tool Company, Waltham, Mass.
U. S. Electrical Mfg. Co., Chicago
Western Mfg. Co., Detroit, Mich.
Westlof Tool Co., Detroit.

DRIVES, Variable-Speed (See TRANSMISSIONS, Variable-Speed)

DRIVES, "V"-Belt
*Allis-Chalmers Mfg. Co., Milwaukee
American Pulley Co., Philadelphia
Bond Co., Chas., Philadelphia
Dayton Rubber Mfg. Co., Dayton, O.
Dodge Mfg. Corp., Mishawaka, Ind.
*Fairbanks-Morse Co., Chicago
Gates Rubber Co., Denver, Colo.
Goodrich Co., B. F., Akron, O.
Hill Clutch Machine & Foundry Co., Cleveland
Medart Co., St. Louis, Mo.
Raybestos-Manhattan, Inc., Passaic, N. J.
Rockwood Mfg. Co., Indianapolis, Ind.
Stephens-Adamson Mfg. Co., Aurora, Ill.
Worthington Pump & Machy. Corp., Harrison, N. J.

DRIVES, Worm
*Adams Company, Dubuque, Iowa
Bilgram Gear & Machine Works, Philadelphia, Pa.
Boston Gear Works, Inc., No. Quincy, Mass.
Chicago Rawhide Mfg. Co., Chicago
Colonial Broach Co., Detroit, Mich.
Crofoot Gear Corp., Chas. E., So. Easton, Mass.
DeLaval Steam Turbine Co., Trenton, N. J.
Detroit Tap & Tool Co., Detroit, Mich.
*Earle Gear & Mach. Co., Philadelphia
*Ganschow Gear Co., Chicago
*Gear Specialties, Inc., Chicago
*Grant Gear Works, Inc., So. Boston, Mass.
Lempco Products., Inc., Bedford, O.
Link-Belt Company, Philadelphia, Pa.
*Michigan Tool Co., Detroit, Mich.
*Perkins Machine & Gear Co., Springfield, Mass.
*Philadelphia Gear Works, Philadelphia
Smith, Inc., Winfield H., Springville, Erie County, N. Y.

DRYING Machines (See MACHINES, Washing and Drying)

DUPLICATORS (See DIE SINKERS)

ELECTRODES, Welding
*Air Reduction Sales Co., N. Y. C.
*Aluminum Co. of America, Pittsburgh
*American Brass Co., Waterbury, Conn.
American Manganese Steel Div., Chicago Hgts., Ill.
*American Steel & Wire Co., Cleveland, O.
Ampco Metal Inc., Milwaukee, Wis.
Bastian-Blessing Co., Chicago
General Electric Co., Schenectady, N. Y.
Harnischfeger Corp., Milwaukee, Wis.
Haynes-Stellite Co., Kokomo, Ind.
Lee & Son, K. O., Aberdeen, S. D.
Lincoln Electric Co., Cleveland, O.
Linde Air Products Co., Inc., N. Y. C.
McKay Co., Pittsburgh, Pa.
Metal & Thermit Corp., N. Y. C.
National Cylinder Gas Co., Chicago
*Page Steel & Wire Div., Am. Chain & Cable Co., Monessen, Pa.
Roebling's, John A., Sons Co., Trenton, N. J.
*Ryerson & Son, Inc., Jos. T., Chicago
Taylor-Wharton Iron & Steel Co., High Bridge, N. J.
Welding Timer Mfg. Co., Newark, N. J.
*Westinghouse Elec. & Mfg. Co., E. Pittsburgh, Pa.
Wickwire Spencer Steel Co., N. Y. C.
Wilson Welder & Metals Co., N. Y. C.

ELEVATORS, PILERS, or STACKERS, Portable
*Barrett-Cravens Co., Chicago
Jeffrey Mfg. Co., Columbus, O.
Lewis-Shepard Sales Corp., Watertown, Mass.
Link-Belt Co., Chicago
Revolvator Co., N. Bergen, N. J.
Service Caster & Truck Co., Albion, Mich.
Stephens-Adamson Mfg. Co., Aurora, Ill.
Yale & Towne Mfg. Co., Philadelphia

ENAMELING & GALVANIZING MACHINES, Centrifugal
*Tolhurst Centrifugals Div., Am. Mach. & Metals, Inc., E. Moline, Ill.

ENAMELS (See PAINTS, VARNISHES, etc.)

ENGRAVING MACHINES
Eitzen Co., Louis C., N. Y. C.
*Gorton Machine Co., Geo., Racine, Wis.
Ideal Commutator Dresser Co., Sycamore, Ill.
Micro Instrument Co., Cambridge, Mass.
Preis Engraving Machine Co., H. P., Newark, N. J.
*Reed-Prentice Co., Worcester, Mass.

ETCHERS, Electric
Annis Co., R. B., Indianapolis, Ind.
Brewster & Co., Wm., New York, N. Y.
Golden Gate Tool Co., San Francisco, Cal.
Ideal Commutator Dresser Co., Sycamore, Ill.

EXTRACTORS, Broken-Tap
Walton Co., Hartford, Conn.

EXTRACTORS, Centrifugal Oil (See SEPARATORS, Centrifugal)

EXTRACTORS, Screw
*Cleveland Twist Drill Co., Cleveland, O.
Greenfield Tap & Die Corp., Greenfield, Mass.
Morse Twist Drill & Mach. Co., New Bedford, Mass.
Standard Tool Co., Cleveland, O.

EXTRACTORS, Screw Pipe
Ridge Tool Co., Elyria, O.

FANS, Man-Cooler (See BLOWERS)

FASTENERS, Lacing & Clamps, Belt
Armstrong-Bray & Co., Chicago
Bristol Co., Waterbury, Conn.
Chicago Rawhide Mfg. Co., Chicago
Clipper Belt Lacer Co., Grand Rapids, Mich.
Crescent Belt Fastener Co., N. Y. C.
Detroit Belt Lacer Co., Detroit, Mich.
Dodge Mfg. Corp., Mishawaka, Ind.
Flexible Steel Lacing Co., Chicago
Graton & Knight Co., Worcester, Mass.
*Greene, Tweed & Co., N. Y. C.
Jackson, Issac, Belt Fastener Co., N. Y. C.
Republic Steel Corp., Cleveland, O.
Rhoads & Sons, J. E., Philadelphia, Pa.
Safety Belt Lacer Co., Toledo, O.

FEEDS, Die (See FEEDS, Press)

FEEDS, Hydraulic
American Engineering Co., Philadelphia
*Ex-Cell-O Tool Corp., Detroit, Mich.
Hydraulic Press Mfg. Co., Mt. Gilead, O.
*Le Maire Tool & Mfg. Co., Dearborn, Mich.
Logansport Machine Co., Logansport, Ind.
*Oilgear Co., Milwaukee, Wis.
*Sundstrand Machine Tool Co., Rockford, Ill.
*Vickers, Inc., Detroit, Mich.

FEEDS, Press
Bliss Co., E. W., Brooklyn, N. Y.
Dickerman Mfg. Co., H. E., Springfield, Mass.
Federal Press Co., Elkhart, Ind.
Henderson Machine Co., Philadelphia, Pa.
*Henry & Wright Mfg. Co., Hartford, Conn.
*Littell Machine Co., F. J., Chicago
Logansport Machine, Inc., Logansport, Ind.
*Perkins Machine Co., Warren, Mass.
*Producto Machine Co., Bridgeport, Conn.
U. S. Tool Co., Ampere, N. J.
*V. & O. Press Co., Hudson, N. Y.
Walsh Press & Die Co., Chicago
Waterbury-Farrel Morndry & Mach. Co., Waterbury, Conn.
Yoder Co., Cleveland, O.
*Zeh & Hahnemann Co., Newark, N. J.

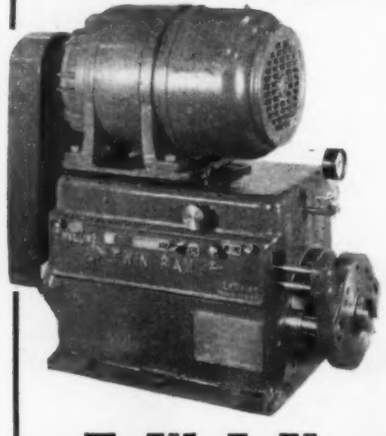
FELT, Mechanical
Aetna Felt Co., N. Y. C.
American Felt Co., N. Y. C.
Armstrong Cork Co., Lancaster, Pa.
Booth Felt Co., Brooklyn, N. Y.
Brawley Felt Co., Brooklyn, N. Y.
Continental Felt Co., N. Y. C.
Felters Co., Boston, Mass.
Fidelity Felt Co., Philadelphia, Pa.
House & Sons, Chas. W., N. Y. C.
Pacific States Felt & Mfg. Co., San Francisco, Cal.
Western Felt Works, Chicago

FILES & RASPS
*American Swiss File & Tool Co., Elizabeth, N. J.
*Atkins and Co., E. C., Indianapolis, Ind.
Carson Newton Co., Belleville, N. J.
Delta File Works, Philadelphia, Pa.
*Disston & Sons, Inc., Henry, Tacony, Philadelphia
*Grobet File Corp. of America, N. Y. C.
Heller Bros. Co., Newark, N. J.
*Nicholson File Co., Providence, R. I.
*Oliver Instrument Co., Adrian, Mich.
*Pratt & Whitney Div. Niles-Bement-Pond Co., Hartford, Conn.
Severance Tool Mfg. Co., Saginaw, Mich.
*Simonds Saw & Steel Co., Fitchburg, Mass.
Stow Mfg. Co., Inc., Binghamton, N. Y.
Strand & Co., N. A., Chicago

FILES, Rotary
*American Swiss File & Tool Co., Elizabeth, N. J.
*Disston, Henry & Sons, Inc., Tacony, Philadelphia, Pa.
Ford, M. A., Mfg. Co., Davenport, Ia.
*Grobet File Corp. of America, N. Y. C.
*Hamilton Tool Co., The, Hamilton, O.
Hayes File Co., Detroit, Mich.
Jarvis, Chas. L., Co., Middletown, Conn.
Mall Tool Co., Chicago
Martindale Electric Co., Lakewood, Cleveland
Murcott & Campbell, Inc., Brooklyn, N. Y.
Sandvik Saw & Tool Corp., N. Y. C.
Severance Tool Mfg. Co., Saginaw, Mich.
Strand, N. A., & Co., Chicago
U. S. Electrical Tool Co., Cincinnati

FILING MACHINES, Die
*Ames Co., B. C., Waltham, Mass.
Cochrane-Bly Co., Rochester, N. Y.

REDUCE COSTS



With our Improved

TWIN-RAM HYDRAULIC FEED UNITS

For all types of production—drilling, tapping, reaming, spotfacing, center boring, and milling, etc. No. 2000—1 to 3 hp., No. 5000—5 to 10 hp. Ball bearing throughout. Write for Bulletin No. 750 today.

LE MAIRE TOOL & MFG. CO.
2657 So. Telegraph Rd. Dearborn, Mich.

PRESSES
FEEDS
AUTOMATIC EQUIPMENT
THE V & O Press Co., INC.
HUDSON, N. Y.

WHERE-TO-BUY DIRECTORY

** Indicates further information to be found in advertising pages.*

*Continental Machines Inc., Milwaukee, Wis.
Grob Bros., Grafton, Wis.
*Harvey Mfg. Co., N. Y. C.
*Illinois Tool Co., Chicago, Ill.
*Oliver Instrument Co., Adrian, Mich.

FILTERS, Oil & Coolant
AC Spark Plug Div., General Motors Corp., Detroit, Mich.
Bowser, S. F., & Co., Fort Wayne, Ind.
Cuno Engineering Co., Meriden, Conn.
Detroit Lubricator Co., Detroit, Mich.
Fauver Co., J. N., Detroit, Mich.
Felters Co., Inc., Boston, Mass.
Fostoria Pressed Steel Co., Fostoria, O.
Goulds Pumps Inc., Seneca Falls, N. Y.
Motor Improvements, Inc., Newark, N. J.

FILTERS, Air
American Air Filter Co., Louisville, Ky.
American Blower Corp., Detroit
American Foundry Equipment Co., Mishawaka, Ind.
Bastian-Blessing Co., Chicago
Binks Mfg. Co., Chicago
*Cincinnati Electrical Tool Co., Cincinnati, O.
Cleveland Pneumatic Tool Co., Cleveland, O.
Cuno Engrg. Corp., Meriden, Conn.
Curtis Pneumatic Machinery Co., St. Louis, Mo.
DeVilbiss Company, Toledo, O.
Felters Co., Boston, Mass.
Fostoria Pressed Steel Corp., Fostoria, O.
Marshalltown Mfg. Co., Marshalltown, Ia.
Mine Safety Appliances Co., Pittsburgh, Pa.
*Norton Company, Worcester, Mass.
Owens-Illinois Glass Co., Toledo, O.
*Standard Electrical Tool Co., Cincinnati, O.
Sterling Products Co., Detroit, Mich.

FINGERS, Feed
Davenport Machine Tool Co., Rochester, N. Y.
*Eastern Machine Screw Corp., New Haven, Conn.
*Hardinge Brothers, Inc., Elmira, N. Y.
Luers, J. Milton, Detroit, Mich.
*Mitts and Merrill, Saginaw, Mich.
Morrison Machine Prod. Div., Elmira, N. Y.
*Rivett Lathe & Grinder, Inc., Brighton, Boston, Mass.

FITTINGS, Wire-Rope
*American Chain & Cable Co., Bridgeport, Conn.
*American Steel & Wire Co. (Subsidiary U. S. Steel Corp.), Chicago
*Bethlehem Steel Co., Bethlehem, Pa.
Burndy Engrg. Co., N. Y. C.
Republic Steel Corp., Cleveland, O.
Roebling's & Sons Co., John A., Trenton, N. J.
Upson-Walton Co., Cleveland, O.
*Williams & Co., J. H., N. Y. C.

FIXTURES, Saw Regrinding
Covel-Hanchett Co., Big Rapids, Mich.
Industrial Engrg. Co., Inc., Minneapolis, Minn.

FLAME-CUTTING MACHINES
*Air Reduction Sales Corp., N. Y. C.
Compressed Industrial Gases, Inc., Chicago
Linde Air Products Co., N. Y. C.
National Cylinder Gas Co., Chicago
*Oster Mfg. Co., Cleveland, O.
Schrader Bowers Co., Mishawaka, Ind.

FLUX, Liquid & Paste, Soldering & Brazing
*Air Reduction Sales Co., New York City
Allen Co., L. B., Chicago
*Atkins, E. C. & Co., Indianapolis, Ind.
Bastian-Blessing Co., Chicago
Benson Co., Alex R., Hudson, N. Y.
Eutectic Welding Alloys, Inc., New York, N. Y.
Garden City Laboratory, Chicago
Handy & Harman, N. Y. C.
Hardy, Inc., Chas., N. Y. C.
Imperial Brass Mfg. Co., Chicago
Linde Air Products Co., N. Y. C.
McGill Mfg. Co., Valparaiso, Ind.
*Ruby Chemical Co., Columbus, O.
Wayne Chemical Products Div. Wayne Soap Co., Detroit, Mich.

FLUX, Welding
*Air Reduction Sales Co., N. Y. C.
Allen, L. B., Co., Inc., Chicago
Anti-Borax Compound Co., Fort Wayne, Ind.
Bastian-Blessing Co., Chicago
Buchanan, C. G., Chemical Co., Norwood, Cincinnati
Chapin, W. R., Co., Indianapolis, Ind.
Colmonoy, Inc., Los Nietos, Calif.
Consolidated Metal Corp., Detroit, Mich.
Eutectic Welding Alloys, Inc., New York, N. Y.
Imperial Brass Mfg. Co., Chicago
K-G Welding & Cutting Co., Inc., N. Y. C.
Lincoln Electric Co., Cleveland, O.
Linde Air Products Co., N. Y. C.
Modern Engineering Co., St. Louis, Mo.
Smith Welding Equipment Corp., Minneapolis, Minn.
Stewart, Park Co., Aspinwall, Pa.
Torchweld Equipment Co., Chicago
Victor Equipt. Co., San Francisco, Calif.

FORGING MACHINES (See also PRESSES, Forging)
*Ajax Mfg. Co., Euclid, Cleveland
Chambersburg Engineering Co., Chambersburg, Pa.
Elmes Engrg. Wks., Chas. F., Chicago
Erie Foundry Co., Erie, Pa.
*Hill-Acme Co., Cleveland, O.
Lake Erie Engrg. Corp., Buffalo, N. Y.
Mesta Machine Co., Pittsburgh, Pa.
National Machinery Co., Tiffin, O.
Waterbury-Farrel Fdry. & Mach. Co., Waterbury, Conn.

FORMING Machines
*Ajax Mfg. Co., Euclid, Cleveland
Baird Machine Co., Bridgeport, Conn.
Bliss Co., E. W., Brooklyn, N. Y.
Chambersburg Engrg. Co., Chambersburg, Pa.
*Cincinnati Shaper Co., Cincinnati, O.
*Cleveland Punch & Shear Works Co., Cleveland, O.
*Consolidated Mach. Tool Corp., Rochester, N. Y.
Elmes Engrg. Works, Chas. F., Chicago
Engrg. & Research Corp., Riverdale, Md.
*Farrel-Birmingham Co., Inc., Ansonia, Conn.
Hannifin Mfg. Co., Chicago
*Henry & Wright Mfg. Co., Hartford, Conn.
Hydraulic Press Mfg. Co., Mt. Gilead, O.
Lewis Machine Co., Cleveland, O.
Kane & Roach Inc. Syracuse N. Y.
Marburg Bros. Inc., N. Y. C.
Mesta Machine Co., Pittsburgh, Pa.
*Niagara Machine & Tool Works, Buffalo, N. Y.
Nilson Machine Co., A. H., Bridgeport, Conn.
Peck, Stow & Wilcox Co., Southington Conn.
Quickwork-Whiting Corp., Harvey, Ill.
Rafter Machine Co., Belleville, N. J.
Robertson Co., John, Brooklyn, N. Y.
*Schatz Mfg. Co., Poughkeepsie, N. Y.
Sleeper & Hartley, Worcester, Mass.
United Engrg. & Fdry. Co., Pittsburgh, Pa.
U. S. Tool Co., Ampere, N. J.
*Watson-Stillman Co., Roselle, N. J.
Whitney Metal Tool Co., Rockford, Ill.
Williams, White & Co., Moline, Ill.
Yoder Co., Cleveland, O.
*Zeh & Hahnemann, Newark, N. J.

FURNACES, Electric
Ajax Electric Co., Philadelphia, Pa.
Ajax Electrothermic Corp., Trenton, N. J.
American Car & Foundry Co., N. Y. C.
Baker & Co., Inc., Newark, N. J.
Bellis Heat Treating Co., Branford, Conn.
Continental Industrial Engineers, Inc., Chicago
*Electric Furnace Co., Salem, O.
Gas Machinery Co., Cleveland, O.
General Electric Co., Schenectady, N. Y.
Gordon Co., Claud S., Chicago
Hayes, Inc., C. I., Providence, R. I.
*Hevi-Duty Electric Co., Milwaukee, Wis.
Holcroft & Co., Detroit, Mich.
Hoskins Mfg. Co., Detroit, Mich.
Leeds & Northrup Co., Philadelphia, Pa.
Lindberg Engineering Co., Chicago
Philadelphia Drying Machinery Co., Philadelphia, Pa.
Rockwell Co., W. S., N. Y. C.
Sentry Co., Foxboro, Mass.
Stark Tool Co., Waltham, Mass.
*Surface Combustion Corp., Toledo, O.
Swoboda, Inc., H. O., Pittsburgh, Pa.
Trent Co., Harold E., Philadelphia, Pa.
*Westinghouse Electric & Mfg. Co., E. Pittsburgh, Pa.

FURNACES, GAS
*American Gas Furnace Co., Elizabeth, N. J.
Continental Industrial Engineers, Inc., Chicago
*Electric Furnace Co., Salem, Ohio
Gas Machinery Co., Cleveland
Holden Co., A. F., New Haven, Conn.
*Hones, Inc., Chas. A., Baldwin, N. Y.
Johnson Gas Appliance Co., Cedar Rapids, Iowa
Lindberg Engrg. Co., Chicago
Strong, Carlisle & Hammond Co., Cleveland
*Surface Combustion Corp., Toledo, O.

FURNITURE, Shop
Aluminum Ladder Co., Tarentum Pa.
Bradley Washfountain Co., Milwaukee, Wis.
General Fireproofing Co., Youngstown, O.
*Hamilton Tool Co., Hamilton, Ohio.
*New Britain-Gridley Machine Co., New Britain, Conn.
Ransome Concrete Machry. Co., Dunellen, N. J.
Remington Rand, Inc., Buffalo, N. Y.
*Standard Pressed Steel Co., Jenkintown, Pa.
Western Tool & Mfg. Co., Springfield, O.
Whistler & Sons, S. B., Buffalo, N. Y.

GAGES, Amplifying
*Federal Products Co., Providence, R. I.
Pike & Co., E. W., Elizabeth, N. J.
*Pratt & Whitney Co., Hartford, Conn.
Scherr Co., Geo., N. Y. C.
*Sheffield Gage Corp., Dayton, O.
Standard Gage Co., Inc., Poughkeepsie, N. Y.
Van Keuren Co., Watertown, Mass.*

CUSTOMERS DEMANDING SPEED?

STEP UP PRODUCTION WITH RUBYFLUID

Minutes count today. Rubyfluid fluxes will help get the soldering and tinning job out faster, better, because Rubyfluid is easy to use, produces strong, neat joints without fuss or bother. Will not corrode the metals. Try it and see. Specify RUBYFLUID for general soldering and tinning, RUBY'S Stainless Steel Flux for that metal.

Write for free information

RUBY CHEMICAL CO.

62 McDowell St. Columbus, Ohio

Rubyfluid

2400° Quickly Attained

Without blower or Power in this new

BUZZER

Reg. U. S. Pat. Off.

Gas Fired Full Muffle Oven Furnace

Just Connect to the Gas Supply Equipped with Diamond Block for Protective atmosphere, this furnace has been primarily designed for high carbon and alloy steels.

Quiet in operation, economical in fuel consumption, easy to control over wide range.

Rugged in construction, effectively insulated.

Write for details

CHARLES A. HONES, INC.

121 South Grand Ave. Baldwin, N. Y.

MODEL No. 16 "SPECIAL"

Constructed as per Specifications of U. S. Naval Aircraft Factories

Reg. U. S. Pat. Off.

BUTTERFLY FILING and SAWING MACHINE

(Die Making Machine)

This is a very heavy, powerful machine and is designed for extra heavy filing and sawing, but it performs small work just as well. This type of machine is usually adopted in Ammunition Plants, Airplane Factories and machine shops where heavy and precision filing and sawing is desired.

We also manufacture smaller machines. Model D and Model EL

Beware of Imitations! Our machine carries the Butterfly trade mark.

HARVEY MANUFACTURING CORP.

161 Grand St. Phone . . CA nal 6-5170 New York

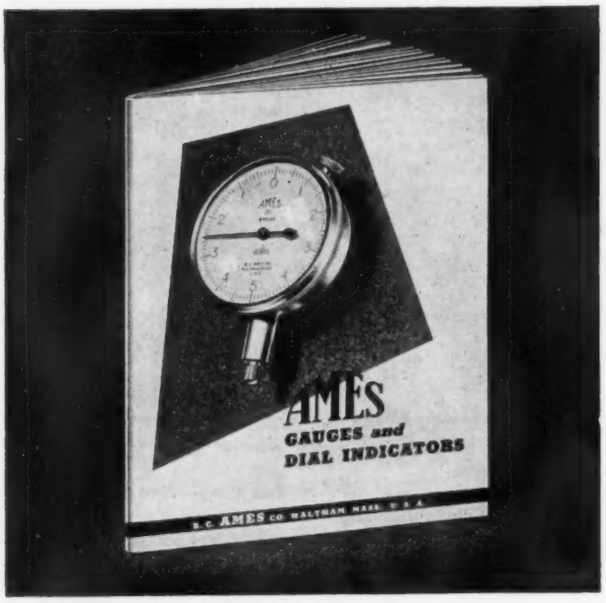
WHERE-TO-BUY DIRECTORY

** Indicates further information to be found in advertising pages.*

GAGES, Caliper
*Brown & Sharpe Mfg. Co., Providence, R. I.
*Federal Products Corp., Providence, R. I.
*Lufkin Rule Co., Saginaw, Mich.
*Sheffield Gage Co., Dayton, Ohio.
*Slocomb, J. T., Co., Providence, R. I.
*Starrett Co., L. S., Athol, Mass.
*Taft-Peirce Mfg. Co., Woonsocket, R. I.
*Williams Co., J. H., N. Y. C.

GAGES, Comparator
*Ames Co., B. C., Waltham, Mass.
Bausch & Lomb Optical Co., Rochester, N. Y.
Coats Machine Tool Co., N. Y. C.
*Federal Products Corp., Providence, R. I.
Index Machinery Corp., Cincinnati, O.
*Jones & Lamson Machine Co., Springfield, Vt.
Marburg Bros., Inc., N. Y. C.
Micro Instrument Co., Cambridge, Mass.
*Pratt & Whitney Div., Niles-Bement-Pond Co., Hartford, Conn.
Scherr Co., Geo., N. Y. C.
*Sheffield Gage Corp., Dayton, O.
Standard Gage Co., Inc., Poughkeepsie, N. Y.
*Starrett Co., L. S., Athol, Mass.
Swedish Gage Co. of America, Detroit
*Taft-Peirce Mfg. Co., Woonsocket, R. I.
Van Keuren Co., Watertown, Mass.
Zeiss, Inc., Carl, N. Y. C.

GAGES, Depth
*Ames, B. C., Co., Waltham, Mass.
*Brown & Sharpe Mfg. Co., Providence, R. I.
Chicago Dial Indicator Co., Chicago
*Continental Machines, Inc., Minneapolis, Minn.
*Federal Products Corp., Providence, R. I.
*Lufkin Rule Co., Saginaw, Mich.
Millers Falls Co., Greenfield, Mass.



Send for your copy . . .

of this new Catalog, just off the press, which shows a complete new line of Ames Gauges and Dial Indicators.

B. C. AMES CO., Waltham, Mass., U. S. A.

RANDALL & STICKNEY
New 1/10,000" Indicator
Model C-10

Range	.005"
Diameter of case	1 15/16"
Diameter over all	2¼"
Depth of case	¾"
Length over all	3⅛"
Lug or Bracket—Offset, on center if desired	Hole 3/16"
Back held in position by	4 large screws
Center of spindle to center of hole in lug	.15/16"
Weight	8 ounces
Stem	9/32 diam.
Dial	0-5-0 or 0-10
Graduated	.0001
Crystal	Non-breakable

Model C-10

RANDALL & STICKNEY
Waltham, Mass., U. S. A.
Makers of Gauges Since 1885

*Pacific Tool & Supply Co., Los Angeles, Calif.
*Pratt & Whitney Div., Niles-Bement-Pond Co., Hartford, Conn.
Scherr Co., Inc., Geo., N. Y. C.
*Sheffield Gage Corp., Dayton, Ohio
Standard Gage Co., Inc., Poughkeepsie, N. Y.
*Starrett Co., L. S., Athol, Mass.
*Taft-Peirce Mfg. Co., Woonsocket, R. I.
Vinco Tool Co., Detroit, Mich.
Zeiss, Inc., Carl, N. Y. C.

GAGES, Dial
*Ames Co., B. C., Waltham, Mass.
*Brown & Sharpe Mfg. Co., Providence, R. I.
Chicago Dial Indicator Co., Chicago
*Federal Products Corp., Providence, R. I.
Index Machinery Corp., Cincinnati, O.
Koch Test Indicator, Nyack, N. Y.
Oslund Tool & Die Co., Hartford, Conn.
*Pacific Tool & Supply Co., Los Angeles, Calif.
*Randall & Stickney, Waltham, Mass.
Size Control Co., Chicago, Ill.
*Starrett Co., L. S., Athol, Mass.
*Taft-Peirce Mfg. Co., Woonsocket, R. I.
Zeiss, Inc., Carl, N. Y. C.

GAGES, Drill-Center
*Brown & Sharpe Mfg. Co., Providence, R. I.
*Lufkin Rule Co., Saginaw, Mich.
Morse Twist Drill Co., New Bedford, Mass.
*Slocomb Co., J. T., Providence, R. I.
Standard Tool Co., Cleveland, O.
*Starrett Co., L. S., Athol, Mass.
*Union Twist Drill Co., Athol, Mass.

GAGES, Height
*Brown & Sharpe Mfg. Co., Providence, R. I.
*Continental Machines, Inc., Minneapolis, Minn.
*Lufkin Rule Co., Saginaw, Mich.
*Pacific Tool & Supply Co., Los Angeles, Calif.
Scherr Co., Inc., Geo., N. Y. C.
*Starrett Co., L. S., Athol, Mass.

GAGES, Plug & Ring
*Brown & Sharpe Mfg. Co., Providence, R. I.
Carboloy Co., Detroit, Mich.
*Crafts Co., Inc., Arthur A., Boston
Dickerman Mfg. Co., H. E., Springfield, Mass.
*Federal Products Corp., Providence, R. I.
Greenfield Tap & Die Corp., Greenfield, Mass.
*Hanson-Whitney Machine Co., Hartford, Conn.
*Michigan Tool Co., Detroit, Mich.
Morse Twist Drill & Machine Co., New Bedford, Mass.
*Pratt & Whitney Div., Niles-Bement-Pond Co., Hartford, Conn.
Scherr Co., Inc., Geo., N. Y. C.
*Sheffield Gage Corp., Dayton, O.
Size Control Co., Chicago, Ill.
*Slocomb Co., J. T., Providence, R. I.
Standard Gage Co., Poughkeepsie, N. Y.
Swedish Gage Co. of America, Detroit
*Taft-Peirce Mfg. Co., Woonsocket, R. I.
Van Keuren Co., Watertown, Mass.
Vinco Tool Co., Detroit, Mich.
*Williams Co., J. H., Buffalo, N. Y.
Zeiss, Inc., Carl, N. Y. C.

GAGES, Pressure
Amthor Testing Instrument Co., Inc., Brooklyn, N. Y.
Ashcroft American Gauge Div., Manning, Maxwell & Moore, Inc., Bridgeport, Conn.
*Baldwin-Southwark Div. Baldwin Locomotive Wks., Philadelphia, Pa.
Bristol Co., Waterbury, Conn.
*Brown Instrument Co., Philadelphia, Pa.
Crosby Steam Gage & Valve Co., Charlestown, Boston, Mass.
Foxboro Co., Foxboro, Mass.
Leeds & Northrup Co., Philadelphia, Pa.
Marsh, Jas. P., & Co., Chicago, Ill.
Meriam Co., Cleveland, Ohio
Moeller Instrument Co., Inc., Richmond Hill, N. Y. C.
Parks, Harry S., Co., Philadelphia, Pa.
Uehling Instrument Co., Paterson, N. J.
United States Gauge Co., N. Y. C.

GAGES, Profile
Brush Development Co., Cleveland, O.
Physicists Research Co., Ann Arbor, Mich.
*Pratt & Whitney Div., Niles-Bement-Pond Co., Hartford, Conn.
*Sheffield Gage Corp., Dayton, O.
Standard Gage Co., Inc., Poughkeepsie, N. Y.
*Taft-Peirce Mfg. Co., Woonsocket, R. I.
Van Keuren Co., Watertown, Mass.
Vinco Tool Co., Detroit, Mich.

GAGES, Snap (See GAGES, Plug & Ring)

GAGES, Surface
*Ames Co., B. C., Waltham, Mass.
*Brown & Sharpe Mfg. Co., Providence, R. I.
*Lufkin Rule Co., Saginaw, Mich.
Millers Falls Co., Greenfield, Mass.
*Oslund Tool & Die Co., Hartford, Conn.
*Starrett Co., L. S., Athol, Mass.

GAGES, Thickness
*Ames Co., B. C., Waltham, Mass.
*Brown & Sharpe Mfg. Co., Providence, R. I.
Eltzen Co., Louis C., N. Y. C.
*Federal Products Corp., Providence, R. I.
Ford Motor Co., Johansson Div., Dearborn, Mich.
*Lufkin Rule Co., Saginaw, Mich.
Millers Falls Co., Greenfield, Mass.
*Pratt & Whitney Div., Niles-Bement-Pond Co., Hartford, Conn.
*Randall & Stickney Co., Waltham, Mass.
Scherr Co., Inc., Geo., N. Y. C.
*Sheffield Gage Co., Dayton, O.
Standard Gage Co., Inc., Poughkeepsie, N. Y.
*Starrett Co., L. S., Athol, Mass.
*Taft-Peirce Mfg. Co., Woonsocket, R. I.
Van Keuren Co., Watertown, Mass.
Vinco Tool Co., Detroit, Mich.
Zeiss, Inc., Carl, N. Y. C.

GAGES, Thread
Bath & Co., John, Worcester, Mass.
*Brown & Sharpe Mfg. Co., Providence, R. I.
*Federal Products Corp., Providence, R. I.
Greenfield Tap & Die Corp., Greenfield, Mass.
*Hanson-Whitney Machine Co., Hartford, Conn.
*Lufkin Rule Co., Saginaw, Mich.
*Michigan Tool Co., Detroit, Mich.
Millers Falls Co., Greenfield, Mass.
*Pratt & Whitney Div., Niles-Bement-Pond Co., Hartford, Conn.
Scherr Co., Inc., Geo., N. Y. C.
*Sheffield Gage Corp., Dayton, O.
*Slocomb Co., J. T., Providence, R. I.
*Starrett Co., L. S., Athol, Mass.
*Taft-Peirce Mfg. Co., Woonsocket, R. I.

GAGES, Wire
*Atkins & Co., E. C., Indianapolis, Ind.
*Brown & Sharpe Mfg. Co., Providence, R. I.
*Disston & Sons, Inc., Henry, Tacony, Philadelphia, Pa.
*Federal Products Corp., Providence, R. I.
Morse Twist Drill & Mach. Co., New Bedford, Mass.
Standard Tool Co., Cleveland, O.
*Starrett Co., L. S., Athol, Mass.

GASES, Compressed
*Air Reduction Sales Co., N. Y. C.
Compressed Industrial Gases, Chicago
Indiana Oxygen Co., Indianapolis, Ind.
Linde Air Products Co., N. Y. C.
Matheson Co., E. Rutherford, N. J.
National Cylinder Gas Co., Chicago
Southern Oxygen Co., Arlington, Va.
Union Carbide & Carbon Corp., N. Y. C.

GASKETS (See PACKING, Asbestos, Cotton, Felt)

GEAR-CUTTING MACHINES
*Adams Co., Dubuque, Iowa.
Apex Tool & Cutter Co., Shelton, Conn.
*Barber-Colman Co., Rockford, Ill.
Bilgram Gear & Machine Works, Philadelphia, Pa.
*Brown & Sharpe Mfg. Co., Providence, R. I.
Cleveland Hobbing Mach. Co., Cleveland, O.
Colonial Broach Co., Detroit, Mich.
Cross Gear & Machine Co., Detroit, Mich.
*Farrel-Birmingham Co., Buffalo, N. Y.
*Fellows Gear Shaper Co., Springfield, Vt.
*General Machinery Corp. (Niles Tool Wks. Div.), Hamilton, O.
*Gleason Works, Rochester, N. Y.
Gould & Eberhardt, Irvington, N. J.
*Illinois Tool Works, Chicago
*Lees-Bradner Co., Cleveland, O.
*Michigan Tool Co., Detroit, Mich.
*National Broach & Machine Co., Detroit
National Tool Co., Cleveland, O.
*Pratt & Whitney, Div., Niles-Bement-Pond Co., Hartford, Conn.
*Producto Machine Co., Bridgeport, Conn.
Scherr Co., Inc., Geo., N. Y. C.
*Waltham Machine Works, Waltham, Mass.

GEAR-TESTING Machines
*Brown & Sharpe Mfg. Co., Providence, R. I.

WHERE-TO-BUY DIRECTORY

** Indicates further information to be found in advertising pages.*

*Farrel-Birmingham Co., Buffalo, N. Y.
*Fellows Gear Shaper Co., Springfield, Vt.
*Gleason Works, Rochester, N. Y.
*Illinois Tool Works, Chicago
*Lees-Bradner Co., Cleveland, O.
*Michigan Tool Co., Detroit, Mich.
Morse Twist Drill & Machine Co., New Bedford, Mass.
*National Broach & Machine Co., Detroit
*Pratt & Whitney Div., Niles-Bement-Pond Co., Hartford, Conn.
Scherr Co., Inc., Geo., N. Y. C.
Triplex Mach. Tool Corp., N. Y. C.
Van Keuren Co., Watertown, Mass.

GEARS, Cast
American Manganese Steel Div., Am. Brake Shoe & Fdry. Co., Chicago Hghts., Ill.
Birdsboro Steel Fdry. & Mach. Co., Birdsboro, Pa.
*Braun Gear Corp., Brooklyn, N. Y.
Dodge Mfg. Corp., Mishawaka, Ind.
*Earle Gear & Machine Co., Philadelphia
*Farrel-Birmingham Co., Ansonia, Conn.
General Electric Co., Schenectady, N. Y.
*Grant Gear Works Inc., South Boston, Mass.
Link Belt Co., Chicago
Massachusetts Gear & Tool Co., Woburn, Mass.
Mesta Machine Co., Pittsburgh, Pa.
Ohio Gear Co., Cleveland, O.
*Perkins Machine & Gear Co., Springfield, Mass.
*Philadelphia Gear Works, Philadelphia

GEARS, Cut
*Adams Co., Dubuque, Iowa
*Allis-Chalmers Mfg. Co., Milwaukee, Wis.
Atlantic Gear Works, New York, N. Y.
Bilgram Gear & Machine Works, Philadelphia
Boston Gear Works, Inc., N. Quincy, Mass.
*Brown & Sharpe Mfg. Co., Providence, R. I.
*Braun Gear Corp., Brooklyn, N. Y.
Chicago Rawhide Mfg. Co., Chicago
*Cincinnati Gear Co., Cincinnati, O.
*Cincinnati Lathe & Tool Co., Oakley, Cincinnati, O.
Crofoot Gear Corp., Chas. E., Easton, Mass.
*Earle Gear & Machine Co., Philadelphia
*Farrel-Birmingham Co., Inc., Buffalo, N. Y.
*Fellows Gear Shaper Co., Springfield, Vt.
*Foote Bros. Gear & Mach. Corp., Chicago
Foote Gear Works Inc., Cicero, Ill.
*Ganschow Gear Co., Chicago
*Gear Specialties Inc., Chicago
*Gleason Works, Rochester, N. Y.
*Grant Gear Works, Inc., S. Boston, Mass.
*Hartford Special Machinery Co., Hartford, Conn.
*James Mfg. Co., D. O., Chicago
*Johnson Machine Co., Carlyle, Manchester, Conn.
Lempco Products Co., Inc., Bedford, O.
Link Belt Co., Chicago
Massachusetts Gear & Tool Co., Woburn, Mass.
*Meisel Press Mfg. Co., Boston, Mass.
*Michigan Tool Co., Detroit, Mich.
Morse Chain Co., Ithaca, N. Y. (Sprockets).
National-Erie Corp., Erie, Pa.
Ohio Gear Co., Cleveland, O.
Palmer-Bee Co., Detroit, Mich.
*Perkins Machine & Gear Co., Springfield, Mass.
*Philadelphia Gear Works, Philadelphia
Pittsburgh Gear & Machine Co., Pittsburgh, Pa.
Stahl Gear & Machine Co., Cleveland
Vinco Tool Co., Detroit, Mich.

GEARS, Master
*Earle Gear & Mach. Co., Philadelphia
*Fellows Gear Shaper Co., Springfield, Vt.
*Illinois Tool Works, Chicago
*Michigan Tool Co., Detroit, Mich.
*National Broach & Mach. Co., Detroit
National Tool Co., Cleveland, O.
*Pratt & Whitney Div., Niles-Bement-Pond Co., Hartford, Conn.
Vinco Tool Co., Detroit, Mich.

GEARS, Non-Metallic
*Adams Co., Dubuque, Iowa
*Bakelite Corp., N. Y. C.
Bilgram Gear & Machine Works, Philadelphia
Boston Gear Works, Inc., N. Quincy, Mass.
*Braun Gear Corp., Brooklyn, N. Y.
Chicago Rawhide Mfg. Co., Chicago, Ill.
Continental Diamond Fibre Co., Newark, Del.
Dodge Mfg. Co., Mishawaka, Ind.
*Earle Gear & Machine Co., Philadelphia
*Farrel-Birmingham Co., Buffalo, N. Y.
*Foote Bros. Gear & Mach. Corp., Chicago
Foote Gear Works, Inc., Cicero, Ill.
Formica Insulation Co., Cincinnati, O.
*Ganschow Gear Co., Chicago
*Gear Specialties, Inc., Chicago
General Electric Co., Schenectady, N. Y.
*Grant Gear Works Inc., Boston, Mass.
*Hartford Special Machinery Co., Hartford, Conn.
*James Mfg. Co., D. O., Chicago
Massachusetts Gear & Tool Co., Woburn, Mass.
*Meisel Press Mfg. Co., Boston, Mass.
*Perkins Machine & Gear Co., Springfield, Mass.
*Philadelphia Gear Works, Inc., Philadelphia
Smith Inc., Winfield H., Springville, Erie County, N. Y.
Stahl Gear & Machine Co., Cleveland, O.
Synthane Corp., Oaks, Pa.
Taylor Machine Co., Cleveland, O.
*Westinghouse Elec. & Mfg. Co., Pittsburgh, Pa.

GENERATORS, Carbide and Acetylene
*Air Reduction Sales Co., N. Y. C.
Linde Air Products Co., N. Y. C.
National Cylinder Gas Co., Chicago.

GOGGLES, Face Shields & Sweat Bands
American Allsafe Co., Buffalo, N. Y.
*American Optical Co., Southbridge, Mass.
Bastian-Blessing Co., Chicago
Boyer-Campbell Co., Detroit, Mich.
Chicago Eye Shield Co., Chicago
Cover, H. S., Station A., South Bend, Ind.
Davis Emergency Equipt. Co., N. Y. C.
Industrial Products Co., Philadelphia
Pulmosan Safety Equipt. Corp., Brooklyn, N. Y.
Willson Products, Inc., Reading, Pa.

GRAINS, Abrasive
*Abrasive Co., Philadelphia, Pa.
American Fdry. Equip. Co., Mishawaka, Ind.
*Bay State Abrasive Products Co., Westboro, Mass.
Behr-Manning Corp., Troy, N. Y.
Carborundum Co., Niagara Falls, N. Y.
*Clover Mfg. Co., Norwalk, Conn.
Globe Steel Abrasive Co., Mansfield, O.
Minnesota Mining & Mfg. Co., St. Paul, Minn.
*Norton Co., Worcester, Mass.
Pangborn Corp., Hagerstown, Md.
Sterling Grinding Wheel Co., Tiffin, O.

GREASE (see OILS & GREASES, Lubricating)

GRINDERS, Abrasive-Belt
Defiance Machine Works, Defiance, O.
*Delta Mfg. Co., Milwaukee, Wis.
*Hammond Machinery Bldrs., Inc., Kalamazoo, Mich.
*Mattison Machine Works, Rockford, Ill.
Oliver Machinery Co., Grand Rapids, Mich.
Porter Cable Machine Co., Syracuse, N. Y.
*Pratt & Whitney Div., Niles-Bement-Pond Co., Hartford, Conn.
Production Machine Co., Greenfield, Mass.
*Walker-Turner Co., Inc., Plainfield, N. J.

GRINDERS, Bench & Pedestal
Atlas Press Co., Kalamazoo, Mich.
Bergram Mech. Engrg. Co., New Britain, Conn.
Baldor Electric Co., St. Louis, Mo.
*Black & Decker Mfg. Co., Towson, Md.
*Boyar-Schultz Corp., Chicago
*Brown & Sharpe Mfg. Co., Providence, R. I.
Champion Blower & Forge Co., Lancaster, Pa.
Chicago Pneumatic Tool Co., N. Y. C.
*Cincinnati Electrical Tool Co., Cincinnati, O.
Clark Jr. Elec. Co., Jas., Louisville, Ky.
Crystal Lake Machine Wks., Crystal Lake, Ill.
*Delta Mfg. Co., Milwaukee, Wis.
Diehl Mfg. Co., Elizabethport, N. J.
Forbes & Myers, Worcester, Mass.
*Hammond Machinery Bldrs., Inc. Kalamazoo, Mich.
*Hardinge Brothers, Inc., Elmira, N. Y.
Hisey-Wolf Machine Co., Cincinnati, O.
*Hobart Brothers, Troy, Ohio
Independent Pneumatic Tool Co., Chicago
Jarvis Co., Chas. L., Middletown, Conn.
Marathon Elec. Mfg. Corp., Wausau, Wis.
Millers Falls Co., Greenfield, Mass.
*Norton Co., Worcester, Mass.
Oliver Machinery Co., Grand Rapids, Mich.
Porter Cable Machine Co., Syracuse, N. Y.
*Pratt & Whitney Div., Niles-Bement-Pond Co., Hartford, Conn.
Prosser & Son, Thos., New York, N. Y. (Carbide Tool)
Queen City Machine Tool Co., Cincinnati, Ohio
Ransom Grinding Machine Co., Oshkosh, Wis.
Schauer Machine Co., Cincinnati
Speedway Mfg. Co., Cicero, Ill.
Standard Electrical Tool Co., Cincinnati, O.
Stanley Elec. Tool Div., Stanley Works, New Britain, Conn.
Stark Tool Co., Waltham, Mass.
Stoody Co., Whittier, Cal.
Stow Mfg. Co., Inc., Binghamton, N. Y.
U. S. Electrical Motors Inc., Los Angeles, Calif.
U. S. Electrial Tool Co., Cincinnati, O.
Van Dorn Electrical Tool Co., Towson, Md.
Vonnegut Moulder Corp., Indianapolis, Ind.
*Walker Co., O. S., Worcester, Mass.
*Walker-Turner Co., Plainfield, N. J.

GRINDERS, Cam
*Landis Tool Co., Waynesboro, Pa.
*Norton Co., Worcester, Mass.

GRINDERS, Centerless
Commercial Centerless Grinding Co., Cleveland
*Cincinnati Grinders, Inc., Cincinnati.
*Heald Machine Co., Worcester, Mass.
*Metal Carbides Corp., Youngstown, O.
Triplex Machine Tool Co., N. Y. C.

GRINDERS, Cutter & Tool
*Abrasive Machine Tool Co., Providence, R. I.
*Barber-Colman Co., Rockford, Ill.
*Boyar-Schultz Corp., Chicago
*Brown & Sharpe Mfg. Co., Providence, R. I.
Chittenden Corp., Cleveland, O.
*Cincinnati Milling Machine Co., Cincinnati, O.
*Continental Machines, Inc., Minneapolis, Minn.
Covel Mfg. Co., Benton Harbor, Mich.
Davis Boring Tool Co., Div. Larkin-Packer Co., St. Louis, Mo.
*Delta Mfg. Co., Milwaukee, Wis.
*Ex-Cell-O Corp., Detroit, Mich.
*Fellows Gear Shaper Co., Springfield, Vt.
*Gallmeyer & Livingston Co., Grand Rapids, Mich.
*Gisholt Machine Co., Madison, Wis.
*Gorton Machine Co., Geo., Racine, Wis.
*Heald Machine Co., Worcester, Mass.
Hisey-Wolf Mach. Co., Cincinnati, O.
*Indian White Eagle Engrg. & Machine Wks., Brooklyn, N. Y.
*Kearney & Trecker Co., Milwaukee, Wis.
*Landis Machine Co., Waynesboro, Pa.
*Landis Tool Co., Waynesboro, Pa.
*LeBlond Machine Tool Co., R. K., Cincinnati, O.
Lee & Son, Inc., K. O., Aberdeen, S. D.
*National Acme Co., Cleveland, O.
*Norton Co., Worcester, Mass.
*Oliver Instrument Co., Adrian, Mich.
*Pratt & Whitney Div., Niles-Bement-Pond Co., Hartford, Conn.
Precision Gage & Tool Co., Dayton, O.
Preis Engraving Mach. Co., H. P., Newark, N. J.
Rogers, Samuel C., Buffalo, N. Y.
Scherr Co., Inc., Geo., N. Y. C.
Schuyler, W. A., N. Y. C.
Standard Electrical Tool Co., Cincinnati
*Sellers & Co., Wm., Philadelphia, Pa.
Stanley Elec. Tool Div. of Stanley Works, New Britain, Conn.
*Sundstrand Machine Tool Co., Rockford, Ill.
T. C. M. Mfg. Co., Harrison, N. J.
*Thompson Grinder Co., Springfield, O.
*Union Twist Drill Co., Athol, Mass.
U. S. Electrical Tool Co., Cincinnati, O.
*Walker Co., O. S., Worcester, Mass.
Willey's Carbide Tool Co., Detroit, Mich.

GRINDERS, Cylindrical
*Arter Grinding Machine Co., Worcester, Mass.
*Brown & Sharpe Mfg. Co., Providence, R. I.
*Cincinnati Electrical Tool Co., Cincinnati, O.
*Cincinnati Grinders, Inc., Cincinnati, O.
*Dumore Co., Racine, Wis.
*Farrel-Birmingham Co., Inc., Ansonia, Conn.
*Fitchburg Grinding Machine Corp., Fitchburg, Mass.
Garrison Machine Works, Inc., Dayton, O.
*Heald Machine Co., Worcester, Mass.
Hisey-Wolf Machine Co., Cincinnati, O.
*Landis Tool Co., Waynesboro, Pa.
Lempco Products, Inc., Bedford, O.
Morse Twist Drill & Machine Co., New Bedford, Mass.
*Norton Company, Worcester, Mass.
*Thompson Grinder Co., Springfield, O.

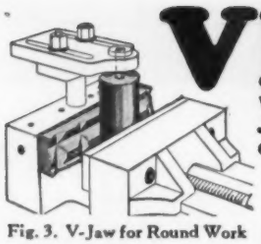
GRINDERS, Disk
Besly & Co., Chas. H., Chicago
*Cincinnati Electrical Tool Co., Cincinnati, O.
Cleveland Elec. Motor Co., Cleveland, O.
*Delta Mfg. Co., Milwaukee, Wis.
Diamond Machine Co., Providence, R. I.
*Fitchburg Grinding Machine Corp., Fitchburg, Mass.
*Gardner Machine Co., Beloit, Wis.
*Hammond Machinery Bldrs., Inc., Kalamazoo, Mich.
Hanchett Mfg. Co., Big Rapids, Mich.
Hisey-Wolf Machine Co., Cincinnati, O.
Millers Falls Co., Greenfield, Mass.
Oliver Machinery Co., Grand Rapids, Mich.
Porter Cable Machine Co., Syracuse, N. Y.
*Pratt & Whitney Div., Niles-Bement-Pond Co., Hartford, Conn.
Production Machine Co., Greenfield, Mass.
Queen City Machine Tool Co., Cincinnati, Ohio
*Standard Electrical Tool Co., Cincinnati, O.
U. S. Electrical Tool Co., Cincinnati, O.
Walls Sales Corp., N. Y. C.

GRINDERS, Drill & Tap
Black Diamond Saw & Mach. Co., Natick, Mass.
Blake Co., Edward, Newton Center, Mass.
*Cincinnati Electrical Tool Co., Cincinnati, O.
Covel Mfg. Co., Benton Harbor, Mich.
*Gallmeyer & Livingston Co., Grand Rapids, Mich.
*Hammond Machinery Bldrs., Inc., Kalamazoo, Mich.
Hisey-Wolf Machine Co., Cincinnati, O.
*Oliver Instrument Co., Adrian, Mich.
*Sellers & Co., Wm., Philadelphia, Pa.
*Standard Electrical Tool Co., Cincinnati, O.
*Union Twist Drill Co., Athol, Mass.
Wells Mfg. Co., Rumford, R. I.

GRINDERS, Flexible-Shaft (see TOOLS, Flexible-Shaft)

GRINDERS, Gear
*Fitchburg Grinding Machine Corp. Fitchburg, Mass.
*Gear Grinding Machine Co., Detroit
*Gleason Works, Rochester, N. Y.
*Lees-Bradner Co., Cleveland, O.
*Pratt & Whitney Div., Niles-Bement-Pond Co., Hartford, Conn.
Triplex Machine Tool Corp., N. Y. C.

GRINDERS, Internal
Baird Machinery Co., Bridgeport, Conn.
*Bryant Chucking Grinder Co., Springfield, Vt.
Crystal Lake Machine Works, Crystal Lake, Ill.



VISE

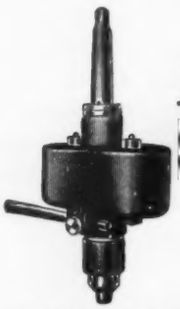
For DRILL PRESS

With and Without Jig Attachments.
Jaws 6", 9" and 12" Long
Often used on Miller, Shaper, Planer

Fig. 3. V-Jaw for Round Work

Attachments mean much drilling — small Jig cost.

Fig. 2 Without Jig Attachments



DRILL

SPEEDER

or High Speed Drilling Attachment

Drives Small Drills up to Proper Speed
INCREASE THE SPEED 3 TIMES
Suits Straight or Taper Shank Drills up to ½" with Speeds to 3,000 R.P.M. For use in Drillers from 20" to largest Radial.

KNURL HOLDER

Swivel Lugs

Shank made to suit turret

For Turret Lathes
Operates like screw Die
Adjustable to any size within its capacity.

TWO SIZES--TWO STYLES
Straight Cut Knurls in Swivel Lugs Produce all Standard Knurling.

Send for Circulars

THE GRAHAM MFG. CO., 73 Willard Ave., PROVIDENCE, R. I.

GRAND RAPIDS
HYDRAULIC FEED
SURFACE GRINDERS

Combine Speed with Accuracy

Built in Many Sizes
Bulletin on Request

Gallmeyer & Livingston Co.
330 Straight Ave. S. W.
Grand Rapids, Mich., U.S.A.

ABRASIVE
Surface Grinders

QUALITY
ACCURACY
DURABILITY
ECONOMY

WRITE FOR PARTICULARS

ABRASIVE MACHINE TOOL CO.
EAST PROVIDENCE, R. I.

WHERE-TO-BUY DIRECTORY

** Indicates further information to be found in advertising pages.*

GRINDERS, Internal (Cont.)
*Fitchburg Grinding Machine Corp., Fitchburg, Mass.
*Hartford Special Machinery Co., Hartford, Conn.
*Heald Machine Co., Worcester, Mass.
*Landis Tool Co., Waynesboro, Pa.
Marburg Bros. Inc., New York, N. Y.
*Rivett Lathe & Grinder Inc., Brighton Boston, Mass.
*Sundstrand Machine Tool Co., Rockford, Ill.
Taylor & Fenn Co., Hartford, Conn.
*Thompson Grinder Co., Springfield, O.
*Van Norman Machine Tool Co., Springfield, Mass.
*Walker Co., O. S., Worcester, Mass.
*Wicaco Machine Corp., Philadelphia

GRINDERS, Knife & Shear-Blade
*Abrasive Machine Tool Co., Providence, R. I.
*Arter Grinding Machine Co., Worcester, Mass.
*Atkins & Co., E. C., Indianapolis, Ind.
Bridgeport Safety Emery Wheel Co., Bridgeport, Conn.
*Cincinnati Electrical Tool Co., Cincinnati, O.
Defiance Machine Works, Defiance, O.
Hanchett Mfg. Co., Big Rapids, Mich.
Hisey-Wolf Machine Co., Cincinnati, O.
*Mattison Machine Works, Rockford, Ill.
Rogers & Co., Samuel C., Buffalo, N. Y.
Standard Electrical Tool Co., Cincinnati, O.

GRINDERS, Portable Electric (See also TOOLS, Portable Electric)
*Black & Decker Mfg. Co., Towson, Md.
Chicago Pneumatic Tool Co., N. Y. C.
*Cincinnati, Electrical Tool Co., Cincinnati, O.
*Dumore Co., Racine, Wis.
Gaston Power Tools, Chicago
*Hammond Machinery Bldrs., Inc., Kalamazoo, Mich.
*Haskins Co., R. G., Chicago
Independent Pneumatic Tool Co., Chicago
Ingersoll-Rand Co., New York, N. Y.
*M-B Products, Detroit, Mich.
Madison-Kipp Corp., Madison, Wis.
Porter-Cable Machine Co., Syracuse, N. Y.
*Pratt & Whitney Div., Niles-Bement-Pond Co., Hartford, Conn.
Sawyer Elec. Mfg. Co., Los Angeles, Calif.
Shuster Co., F. B., New Haven, Conn.
Speedway Mfg. Co., Cicero, Ill.
*Standard Electric Tool Co., Cincinnati
Van Dorn Elec. Tool Co., Towson, Md.

GRINDERS, Lathe-Attachment (see ATTACHMENTS, Lathe)

GRINDERS, Portable Pneumatic (see also TOOLS, Portable Pneumatic)
Chicago Pneumatic Tool Co., N. Y. C.
Independent Pneumatic Tool Co., Chicago, Ill.
Ingersoll-Rand Co. New York, N. Y.
*M-B Products, Detroit, Mich.
Madison-Kipp Corp., Madison, Wis.

GRINDERS, Pulley
*Abrasive Machine Tool Co., Providence, R. I.

GRINDERS, Surface
*Abrasive Machine Tool Co., E. Providence, R. I.
*Arter Grinding Machine Co., Worcester, Mass.
Bergram Mech. Engrg. Co., New Britain, Conn.
Besly & Co., Chas. H., Chicago
*Blanchard Machine Co., Cambridge, Mass.
Bridgeport Safety Emery Wheel Co., Inc., Bridgeport, Conn.
*Brown & Sharpe Mfg. Co., Providence, R. I.
Builders Iron Fdry., Providence, R. I.
*Continental Machines, Inc., Minneapolis, Minn.
Covel Mfg. Co., Benton Harbor, Mich.
*Gallmeyer & Livingston Co., Grand Rapids, Mich.
*Gardner Machine Co., Beloit, Wis.
*Hammond Machy. Builders, Inc., Kalamazoo, Mich.
Hammond Mfg. Co., Cleveland, O.
Hanchett Mfg. Co., Big Rapids, Mich.
*Heald Machine Co., Worcester, Mass.
*Hill-Acme Co., Cleveland, O.
Hisey-Wolf Machine Co., Cincinnati, O.
*Landis Tool Co., Waynesboro, Pa.
*Mattison Machine Works, Rockford, Ill.
*Murchey Machine & Tool Co., Detroit
*Norton Co., Worcester, Mass.
*Pratt & Whitney Div., Niles-Bement-Pond Co., Hartford, Conn.
Reid Brothers Co., Inc., Beverly, Mass.
*Thompson Grinder Co., Springfield, O.
*Van Norman Machine Tool Co., Springfield, Mass.
*Walker Co., O. S., Worcester, Mass.
Wesson Co., Detroit, Mich.
Williams, White & Co., Moline, Ill.

GRINDERS, Swing Frame
*Jefferson Machine Tool Co., Cincinnati, Ohio

GRINDERS, Thread
*Ex-Cell-O Corp., Detroit, Mich.
*Jones & Lamson Machine Co., Springfield, Vt.

GRINDERS, Universal
*Brown & Sharpe Mfg. Co., Providence, R. I.
*Cincinnati Grinders, Inc., Cincinnati, O.
Cosa Oversea Trading Corp., New York, N. Y.
Covel Mfg. Co., Benton Harbor, Mich.
Crystal Lake Machine Works, Crystal Lake, Ill.
*Fitchburg Grinding Machine Corp., Fitchburg, Mass.
*Landis Tool Co., Waynesboro, Pa.
*LeBlond Mach. Tool Co., R. K., Cincinnati, O.
Morse Twist Drill & Machine Co., New Bedford, Mass.
*Norton Co., Worcester, Mass.
*Rivett Lathe & Grinder, Inc., Brighton, Boston, Mass.
*Thompson Grinder Co., Springfield, Ohio

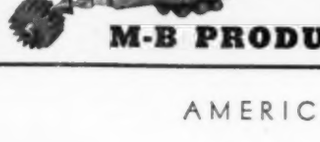
GRINDING, Centerless (See CONTRACT WORK)

GROOVERS, Oil
Defiance Machine Works, Defiance, O.
*Hanson-Whitney Machine Co., Hartford, Conn.
*National Machine Tool Co., Cincinnati, O.
*Wicaco Machine Corp., Philadelphia, Pa.

GUARDS & SAFETY APPLIANCES, Machinery
Benjamin Electric Mfg. Co., Des Plaines, Ill.
Boyer-Campbell Co., Detroit, Mich.
Buffalo Wire Works Co., Inc., Buffalo, N. Y.
Bullard, E. D., Co., San Francisco, Cal.
Chicago Eye Shield Co., Chicago
Cleveland Blow Pipe & Mfg. Co., Cleveland, O.
Clizbe Bros. Mfg. Co., Plymouth, Ind.
Diamond Iron Works, Inc., Minneapolis, Minn.
Geuder, Paeschke & Frey Co., Milwaukee, Wis.
Gustafson & Scott Mfg. Co., Chicago
Johnson, E. P., Rule Mfg. Co., Chicago
Jones Superior Machine Co., Chicago

The M-B 'UTILITY' PNEUMATIC GRINDER MODEL U-T.R.

A 60,000 R. P. M. Unit



Steel Housing (For Safety)
•
Special Grease Sealed Bearings
•
No Lubrication Required
•
Other Models—Also Air Line Filters And Automatic Air Line Lubricators

M-B PRODUCTS 128 East Larned St. Detroit, Mich.

WHERE-TO-BUY DIRECTORY

** Indicates further information to be found in advertising pages.*

*Junkin Safety Appliance Co., Louisville, Ky.
Littleford Bros., Cincinnati, O.
Palmer-Bee Co., Detroit, Mich.
Pennsylvania Furnace & Iron Co., Warren, Pa.
Positive Safety Mfg. Co., Cleveland, O.
Pulmosan Safety Equipment Corp., Brooklyn, N. Y.
Ross, David J., Co., Benton Harbor, Mich.
Safety Equipment Service Co., Cleveland, O.
Schrader's, A., Son, Div. of Scovill Mfg. Co., Inc., Brooklyn, N. Y.
Tally-Meter Co., Norwich, Conn.
Taylor-Shantz, Inc., Rochester, N. Y.

GUNS, Grease & Oil
Adams Grease Gun Corp., N. Y. C.
Alemite Div., Stewart-Warner Corp., Chicago
Binks Mfg. Co., Chicago
Bowen Products Corp., Detroit, Mich.
De Vilbiss Co., Toledo, O.
Dover Stamping & Mfg. Co., Cambridge, Mass.
Essex Brass Corp., Detroit, Mich.
Fauver, J. N., Co., Inc., Detroit, Mich.
*Gibraltar Equip. & Mfg. Co., St. Louis, Mo.
Milburn, Alexander, Co., Baltimore, Md.
Noera Mfg. Co., Waterbury, Conn.
Perkins Marine Lamp & Hardware Corp., Brooklyn, N. Y.
Rogers Products Co., Inc., Jersey City
Rose, Frank, Mfg. Co., Hastings, Neb.
Scaife, Wm. B. & Sons Co., Oakmont, Pa.
Stevens, Walden, Inc., Worcester, Mass.
Turner Brass Works, Sycamore, Ill. (Oil only)
U. S. Air Compressor Co., Cleveland, O.

HAMMERS, Drop
Billings & Spencer Co., Hartford, Conn.
Bliss Co., E. W., Brooklyn, N. Y.
Chambersburg Engrg. Co., Chambersburg, Pa.
Erie Foundry Co., Erie, Pa.
*Farrel-Birmingham Co., Ansonia, Conn.
Henderson Machine Co., Philadelphia, Pa.
Morgan Engrg. Co., Alliance, O.
*Niagara Machine & Tool Wks., Buffalo, N. Y.
Peck, Stow & Wilcox Co., Southington, Conn.
Pneumatic Drop Hammer Co., Braintree, Mass.
Williams, White & Co., Moline, Ill.

HAMMERS, Portable Electric
*Black & Decker Mfg. Co., Towson, Md.
Chicago Pneumatic Tool Co., N. Y. C.
Cleveland Pneumatic Tool Co., Cleveland, O.
Independent Pneumatic Tool Co., Chicago
Ingersoll-Rand Co., New York, N. Y.
Speedway Mfg. Co., Cicero, Ill.
Stanley Electric Tool Div., Stanley Works, New Britain, Conn.
U. S. Electrical Tool Co., Cincinnati, O.
Van Dorn Electric Tool Co., Towson, Md.

HAMMER, Portable Pneumatic
Chicago Pneumatic Tool Co., N. Y. C.
Independent Pneumatic Tool Co., Chicago
Ingersoll-Rand Co., New York, N. Y.
Keller, Wm. H., Inc., Grand Haven, Mich.
Marburg Bros. Inc., N. Y. C.

HAMMERS, Power
Bradley & Sons, C. C., Syracuse, N. Y.
Erie Foundry Co., Erie, Pa.
*General Machinery Corp. (Niles Tool Works Div.), Hamilton, O.
Ingersoll-Rand Co., New York, N. Y.
Murray Mfg. Co., D. J., Wausau, Wis.
Nazel Engrg. Co., Philadelphia, Pa.
*Sellers & Co., Wm., Philadelphia, Pa.

HAMMERS, Softfaced
Bonney Forge & Tool Works, Allentown, Pa.
Chicago Rawhide Mfg. Co., Chicago, Ill.
Goodrich Co., B. F., Akron, O.
*Greene, Tweed & Co., N. Y. C.
*Johnson Tool Co., Inc., E. Providence, R. I.
Stanley Tools, New Britain, Conn.

HAMMERS, Steam
Alliance Machine Co., Alliance, O.
Chambersburg Engrg. Co., Chambersburg, Pa.
Erie Foundry Co., Erie, Pa.
*General Machinery Corp., Hamilton, O.
Industrial Brownhoist Corp., Bay City, Mich.
Mesta Machine Co., Pittsburgh, Pa.
Morgan Engrg. Co., Alliance, O.
*Sellers & Co., Wm., Philadelphia

HANDLES, Crank & Machine
Cincinnati Ball Crank Co., Oakley, Cincinnati
*Williams & Co., J. H., Buffalo, N. Y.

HANDLES, File
Delta File Works, Philadelphia, Pa.
*Disston & Sons, Inc., Henry, Tacony, Philadelphia, Pa.
*Nicholson File Co., Providence, R. I.
Parker-Kalon Corp., N. Y. C.
Stanley Tools, New Britain, Conn.

HANGERS, Shaft
Ahlberg Bearing Co., Chicago
*Allis-Chalmers Mfg. Co., Milwaukee, Wis.
American Pulley Co., Philadelphia, Pa.
Boston Gear Works, Inc., N. Quincy, Mass.
*Brown & Sharpe Mfg. Co., Providence, R. I.
Diamond Chain & Mfg. Co., Indianapolis, Ind.
Dodge Mfg. Corp., Mishawaka, Ind.
Fafnir Bearing Co., New Britain, Conn.
Hanson Clutch & Machinery Co., Tiffin, O.
Link-Belt Co., Chicago
*Marlin-Rockwell Corp., Jamestown, N. Y.
Medart Co., St. Louis, Mo.
Morse Chain Co., Ithaca, N. Y.
Royersford Fdry. & Mach. Co., Inc., Royersford, Pa.
Shafer Bearing Corp., Chicago
*SKF Industries, Inc., Philadelphia
*Standard Pressed Steel Co., Jenkintown, Pa.

HARDENING MACHINES, Electric-Induction
Ohio Crankshaft Co., Cleveland, O.

HARDENING MACHINES, Flame
*Air Reduction Sales Corp., N. Y. C.
*Farrel-Birmingham Co., Inc., Buffalo, N. Y.
*Fellows Gear Shaper Co., Springfield, Vt.
*Gleason Works, Rochester, N. Y.
Linde Air Prod. Co., N. Y. C.
National Cylinder Gas Co., Chicago

HEADERS, Rivet
*Ajax Mfg. Co., Cleveland, O.
*Grant Mfg. & Machine Co., Bridgeport, Conn.
High Speed Hammer Co., Inc., Rochester, N. Y.
*Hill-Acme Co., Cleveland, O.
National Machinery Co., Tiffin, O.
Rock River Machine Co., Janesville, Wis.
*Tomkins-Johnson Co., Jackson, Mich.
Waterbury Farrel Foundry & Machine Co., Waterbury, Conn.*

Made in 5 sizes with interchangeable faces of rawhide, copper and babbit

Specify *EMPIRE Rawhide Mallets for lighter work

You can take out the old faces and insert new ones in the BASA Hammer ***in a few seconds.*** The head is of cadmium-plated tempered special alloy-steel, and the rawhide faces are of Java water-buffalo processed in our own plant. Every mechanic who sees a BASA Hammer wants one for his own work. Order a BASA Hammer from your Distributor, so you can SEE its many superiorities.

GREENE, TWEED & CO.
101 Park Ave., New York City

*Reg. U.S. Pat. Off.

The BASA* Replaceable Face HAMMER

GRANT

RIVETERS—PIONEERS in their line—Head rivets from smallest to ⅛" diameter either by NOISELESS SPINNING or VIBRATING HAMMER method — Sizes to meet all needs—Types include Vertical and Horizontal Multiple Spindles.

Write for literature and don't forget to send samples.

THE GRANT MFG. & MACHINE CO.
85 Shillman Ave., Bridgeport, Conn., U. S. A.

*Six power presses.—*Six careless motions.—*Six men suffering untold misery and permanently handicapped in earning a living.—*Six employers must pay the bill of over $9,000.00 in compensation alone.

Junkin Guards Stop Press Accidents

Complete Information on request

JUNKIN SAFETY APPLIANCE CO.
Incorporated
934 W. Hill St. Louisville, Ky.

LEAD HAMMERS . . .

All sizes from 1 to 15 pounds.

Our 3-4-5 and 6-lb. hammers equipped with our new Shur-Grip malleable iron handles designed to fit the hand. There is no turning or slipping of hammer with this handle. Also, moulds for making hammers.

JOHNSON TOOL CO., INC. East Providence Rhode Island

Round

DR DAVID ROUND HOISTS & CRANES

Since 1869

AUTO-BLOC
(Patented) CHAIN HOIST

Capacity: ½ to 40 tons. The Auto-Bloc has only two gears, yet develops a mechanical efficiency of approximately 90%. *Alloy Steel Cut Gears*—stub tooth pattern, hardened and ground, provide maximum strength. *Unbreakable Cover*—drop forged chrome manganese steel. *Drop Forged Steel Hooks*—lower swivel hook is detachable. High quality *Steel Load Chain*—each link accurately formed and expertly welded for perfect fit and maximum strength.

The DAVID ROUND Line

A complete line of Chain Hoists, Trolleys, Traveling Cranes, Winches and Crabs; Welded Chains for conveyor, dredge, hoist, railroad, sling and every industrial application.

ASSOCIATE COMPANIES

CLEVELAND, OHIO, Cleveland Chain & Mfg. Co.
BRIDGEPORT, CONN., Bridgeport Chain & Mfg. Co.
SEATTLE, WASH., Seattle Chain & Mfg. Co.
SOUTH SAN FRANCISCO, CALIF., Round California Chain Corp., Ltd.

DAVID ROUND & SON
CLEVELAND, OHIO

ERRINGTON
STAPLETON, STATEN ISLAND, N. Y.

MULTIPLE HEADS

Super-Sensitive Fixed-Center Multiple Drilling Heads

Fixed-Center Auto-Reverse Multiple Tapping Heads

All Parts Fully Enclosed to Insure Pressure Lubrication and Rigid Support of Adjustable Spindles

ADJUSTABLE MULTIPLE SPINDLE DRILLING HEAD

WHERE-TO-BUY DIRECTORY

** Indicates further information to be found in advertising pages.*

HEADS, Boring
Chicago Tool & Engrg. Co., Chicago, Ill.
Craley Mfg. Co., C. C., Shillington, Pa.
Davis Boring Tool Div., Larkin-Packer Co., St. Louis, Mo.
Flynn Mfg. Co., Detroit, Mich.
*Fray Machine Tool Co., Glendale, Calif.
Gairing Tool Co., Detroit, Mich.
*Gisholt Machine Co., Madison, Wis.
Lovejoy Tool Co. Inc., Springfield, Vt.
Mummert-Dixon Co., Hanover, Pa.
*O. K. Tool Works Co. Inc., Shelton, Conn.
*Pacific Tool & Supply Co., Los Angeles, Calif.
*Precision Tool Co., Bridgeport, Conn.
Rickert-Shafer Co., Erie, Pa.
*Scully-Jones & Co., Chicago, Ill.
Universal High Speed Tool Co., Chicago, Ill.
Westcott Chuck Co., Oneida, N. Y.

HEADS, Dividing
*Brown & Sharpe Mfg. Co., Providence, R. I.
*Cincinnati Milling Machine Co., Cincinnati, O.
Coats Machine Tool Co., N. Y. C.
Hart Machine Co., Dorchester, Mass.
*Hartford Special Machry. Co., Hartford, Conn.
*L. W. Chuck Co., Toledo, O.
Miller & Crowningshield, Greenfield, Mass.
Zeiss, Inc., Carl, N. Y. C.

HEADS, Drilling
Baker Bros., Inc., Toledo, O.
*Barnes Drill Co., Rockford, Ill.
*Bradford Machine Tool Co., Cincinnati, O.
*Buffalo Forge Co., Buffalo, N. Y.
Buhr Machine Tool Co., Ann Arbor, Mich.
Defiance Machine Works, Defiance, O.
*Errington Mech. Lab., Stapleton, N. Y
*Etteo Tool Co., Brooklyn, N. Y.
*Ex-Cell-O Corp., Detroit, Mich.
Foote-Burt Co., Cleveland, O.
Greenlee Bros. Co., Rockford, Ill.
Hoefer Mfg. Co., Freeport, Ill.
*Kingsbury Machine Tool Co., Keene, N. H.
Langelier Mfg. Co., Cranston, R. I.
*Leland-Gifford Co., Worcester, Mass.
*LeMaire Tool & Mfg. Co., Dearborn, Mich.
Linderme Machine & Tool Co., Detroit
*Moline Tool Co., Moline, Ill.
National Automatic Tool Co., Richmond, Ind.
*Snyder Tool & Engrg. Co., Detroit, Mich.
*U. S. Drill Head Co., Cincinnati, O.

HEADS, Tapping
Baker Bros., Inc., Toledo, O.
*Barnes Co., W. F. & John, Rockford, Ill.
*Bradford Machine Tool Co., Cincinnati, O.
Buhr Machine Tool Co., Ann Arbor, Mich.
Cross Gear & Machine Co., Detroit, Mich.
*Errington Mech. Lab., Stapleton, N. Y.
*Etteo Tool Co., Brooklyn, N. Y.
Foote-Burt Co., Cleveland, O.
Greenlee Bros. & Co., Rockford, Ill.
Hoefer Mfg. Co., Freeport, Ill.
Jarvis Co., Chas. L., Middletown, Conn.
*Kingsbury Machine Tool Co., Keene, N. H.
*Leland-Gifford Co., Worcester, Mass.
National Automatic Tool Co., Richmond, Ind.
Procunier Safety Chuck Co., Chicago
Rockford Drilling Machine Co., Rockford, Ill.

HEATERS & COOLERS, Oil & Coolant
Harrison Radiator Div. General Motors Corp., Lockport, N. Y.
Schutte & Koerting Co., Philadelphia, Pa.

HEATERS, Rivet
*American Car & Foundry Co., N. Y. C.
*American Gas Furnace Co., Elizabeth, N. J.
General Electric Co., Schenectady, N. Y.
Kenworthy, Inc., Chas. F., Waterbury, Conn.

HEATERS, Unit
Acme Electric Heating Co., Boston, Mass.
Automatic Gas Steam Radiator Co., Pittsburgh
Electric Air Heater Co., Div. Am. Fdry. Equipt. Co., Mishawaka, Ind.
Murray Mfg. Co., D. J., Wausau, Wis.
Sturtevant Co., B. F., Hyde Park, Boston, Mass.
Trane Co., LaCrosse, Wis.
Unit Heater & Cooler Co., Wausau, Wis.
Wing Mfg. Co., L. J., N. Y. C.
Wesley Steel Treating Co., Milwaukee
*Wiedemann Machine Co., Phila., Pa.
Wooler, Robert, Philadelphia, Pa.

HELMETS & SHIELDS, Welding
*Air Reduction Sales Co., N. Y. C.
*American Optical Co., Southbridge, Mass.
Boyer-Campbell Co., Detroit, Mich.
Davis Emergency Equip. Co., N. Y. C.
Harnischfeger Corp., Milwaukee, Wis.
Hobart Bros. Co., Troy, O.
Industrial Gloves Co., Danville, Ill.
Jackson Electrode Holder Co., Detroit
Lincoln Electric Co., Cleveland, O.
Linde Air Products Co., N. Y. C.
Mine Safety Appliances Co., Pittsburgh
National Cylinder Gas Co., Chicago
Sellstrom Mfg. Co., Inc., Chicago
Willson Products Inc., Reading, Pa.
Wilson Welder & Metals Co., N. Y. C.

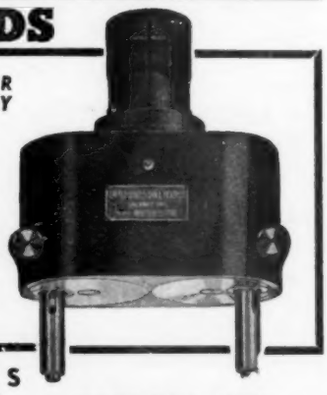
HOBBERS, Gear
*Adams Co., Dubuque, Iowa
*Barber-Colman Co., Rockford, Ill.
*Brown & Sharpe Mfg. Co., Providence, R. I.
Cleveland Hobbing Machine Co., Cleveland
Cosa Oversea Trading Corp., New York, N. Y.
Gould & Eberhardt, Irvington, N. J.
*Lees-Bradner Co., Cleveland, O.
Scherr Co., Geo., N. Y. C.
Triplex Mach. Tool Corp., N. Y. C.

HOBS
*Barber-Colman Co., Rockfold, Ill.
Bath & Co., John, Worcester, Mass.
*Brown & Sharpe Mfg. Co., Providence, R. I.
*Hanson-Whitney Machine Co., Hartford, Conn.
Haynes Stellite Co., Kokomo, Ind.
*Illinois Tool Works, Chicago
*Michigan Tool Co., Detroit, Mich.
National Tool Co., Cleveland, O.

U. S. HEADS

STANDARD EQUIPMENT FOR OVER A QUARTER CENTURY

The illustrated Two Spindle Head with both Spindles adjustable is just one of the many types available. These include all types of Adjustable, Fixed Center Multiple Spindle Heads. Heads will also be made to individual order. Send your blueprints for quotations.



UNITED STATES DRILL HEAD CO. CINCINNATI, OHIO

WHERE-TO-BUY DIRECTORY

** Indicates further information to be found in advertising pages.*

*National Twist Drill & Tool Co., Detroit
*Pratt & Whitney Div., Niles-Bement-Pond Co., Hartford, Conn.
*Union Twist Drill Co., Athol, Mass.

HOISTS, Chain
Chisholm-Moore Hoist Corp., Tonawanda, N. Y.
Coffing Hoist Co., Danville, Ill.
Conco Engrg. Works, Mendota, Ill.
Ford Chain Block Div., Am. Chain & Cable Co., Philadelphia, Pa.
Harrington Co., Philadelphia, Pa.
Hobbs Co., Clinton E., Boston, Mass.
McCollum Hoist & Mfg. Co., Downers Grove, Ill.
Morris, Inc., Herbert, Buffalo, N. Y.
*Page Steel & Wire Div. Am. Chain & Cable Co., Inc., Monessen, Pa.
Reading Chain & Block Corp., Reading, Pa.
Robbins & Myers, Inc., Springfield, O.
*Round & Son, David, Cleveland, Ohio
Stephens-Adamson Mfg. Co., Aurora, Ill.
Union Mfg. Co., New Britain, Conn.
*Wright Mfg. Div. of Am. Chain Cable Co., York, Pa.
Yale & Towne Mfg. Co., Philadelphia, Pa.

HOISTS, Electric
Advance Foundry Co., Dayton, O.
*Allis-Chalmers Mfg. Co., Milwaukee, Wis.
American Engrg. Co., Philadelphia, Pa.
Chisholm-Moore Hoist Corp., Tonawanda, N. Y.
Coeur d'Alene Hardward & Foundry Co., Wallace, Idaho
Coffing Hoist Co., Danville, Ill.
Detroit Hoist & Machine Co., Detroit, Mich.
Euclid Crane & Hoist Co., Euclid, O.
Electro Lift, Inc., N. Y. C.
Harnischfeger Corp., Milwaukee, Wis.
Harrington Co., Philadelphia, Pa.
Industrial Brownhoist Corp., Cleveland, O.
Jeffrey Mfg. Co., Columbus, O.
Lewis-Shepard Sales Corp., Watertown, Mass.
Master Electric Co., Dayton, O.
McCollum Hoist & Mfg. Co., Downers Grove, Ill.
Northern Engrg. Works, Detroit, Mich.
*Philadelphia Gear Works, Philadelphia
Reading Chain & Block Corp., Reading, Pa.
Robbins & Myers, Springfield, O.
Shaw-Box Crane & Hoist Div., Manning, Maxwell & Moore, Inc., Muskegon, Mich.
Shepard Niles Crane & Hoist Corp., Montour Falls, N. Y.
*Wright Mfg. Div., Amer. Chain & Cable Co., York, Pa.
Yale & Towne Mfg. Co., Philadelphia, Pa.

HOISTS, Pneumatic
Chicago Pneumatic Tool Co., N. Y. C.
Curtis Pneumatic Machinery Co., St. Louis, Mo.
Hanna Engrg. Works, Chicago
Hannifin Mfg. Co., Chicago
Independent Pneumatic Tool Co., Chicago
Ingersoll-Rand Co., N. Y. C.
Logansport Machine, Inc., Logansport, Ind.
Northern Engrg. Works, Detroit, Mich.
Sullivan Machinery Co., Michigan City, Ind.
*Tomkins-Johnson Co., Jackson, Mich.

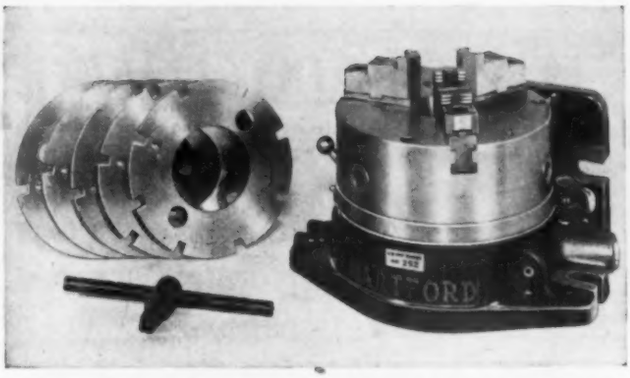
HOLDERS, Tool
Apex Machine & Tool Co., Dayton, O.
*Armstrong Bros. Tool Co., Chicago
*Cincinnati Lathe & Tool Co., Oakley, Cincinnati
Colonial Broach Co., Detroit, Mich.
Detroit Tap & Tool Co., Detroit, Mich.
Elk Machine Tool Works, N. Y. C.
*Errington Mech. Lab., Stapleton, N. Y.
Four-Grip Tool Co., Paterson, N. J.
Gairing Tool Co., Detroit, Mich.
*Gisholt Machine Co., Madison, Wis.
*Michigan Tool Co., Detroit, Mich.
Morse Tool Co., Detroit, Mich.
Morse Twist Drill & Machine Co., New Bedford, Mass.
*O. K. Tool Co., Shelton, Conn.
R. & L. Tools, Nicetown, Philadelphia
*Ready Tool Co., Bridgeport, Conn.
*Scully-Jones & Co., Chicago, Ill.
Wesson Co., Detroit, Mich.
Western Tool & Mfg. Co., Springfield, O.
*Williams & Co., J. H., Buffalo, N. Y.

HONES & HONING MACHINES
*Barnes Drill Co., Rockford, Ill.
*Barnes Co., W. F., & John, Rockford, Ill.
Carborundum Co., Niagara Falls, N. Y.
Cosa Oversea Trading Corp., New York, N. Y.
Honing Equipment Corp., Detroit, Mich.
*Micromatic Hone Corp., Detroit, Mich.
*Norton Co., Worcester, Mass.

HOSE, Flexible Metal
*American Metal Hose Branch, Am. Brass Co., Waterbury, Conn.
Atlantic Metal Hose Co., Inc., N. Y. C.
Breeze Corporations, Inc., Newark, N. J.
Chicago Metal Hose Corp., Maywood, Ill.
DeVilbiss Co., Toledo, O.
Eastman Mfg. Co., Manitowoc, Wis.
Eclipse Aviation Div. of Bendix Aviation Corp., Bendix, N. J.
Goodall Rubber Co., Philadelphia, Pa.
Keystone Brass & Rubber Co., Philadelphia, Pa.
Mulconroy Co., Philadelphia, Pa.
Packless Metal Products Corp., L. I. City, N. Y.
Penn. Flexible Metallic Tubing Co., Philadelphia
Seamlex Co., Inc., L. I. City, N. Y.
Titeflex Metal Hose Co., Newark, N. J.
Walker Brothers, Conshohocken, Pa.
Weatherhead Co., Cleveland, O.
Whitehead Bros. Rubber Co., Trenton, N. J.

HOSE, Rubber
Boston Woven Hose & Rubber Co., Cambridge, Mass.
Dayton Rubber Mfg. Co., Dayton, O.
Electric Hose & Rubber Co., Wilmington, Del.
Gates Rubber Co., Denver, Colo.
Goodrich Co., B. F., Akron, O.
Manhattan Rubber Mfg. Div., Passaic, N. J.
N. Y. Belting & Packing Co., Passaic, N. J.
U. S. Rubber Co., N. Y. C.

INDEXING Fixtures (see also GRINDERS, Universal)
*Hartford Special Machinery Co., Hartford, Conn.



THE HARTFORD SUPER-SPACER

assures high returns on a moderate investment . . . . . .

With this modern spacing and holding device you can step up the efficiency of your millers, drills, slotters, grinders and planers.

The Hartford SUPER-SPACER provides rigid holding of work and maintained accuracy on indexing operations. It enables you to operate your machine tools at maximum efficiency and is a profit-earner whether used in the tool room for single piece work or on the production line where many pieces are involved.

If you are interested in making substantial savings in set-up time and in getting more and better work out of your machine tools—investigate the Hartford Super-Spacer—TODAY!

Complete Details Available Promptly on Request

THE HARTFORD SPECIAL MACHINERY CO.
HARTFORD, CONN.

LATHE TOOLS

THAT LAST LONGER

because they are made of alloy steel drop forgings properly hardened for extreme strength. Will not break.

A hardened tool steel bearing electrically welded in place supports tool bit against heavy cuts.

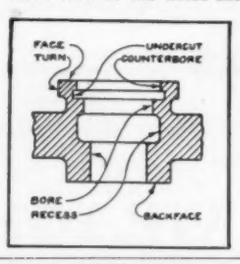
Write for catalog A41.

THE READY TOOL COMPANY
Iranistan & R. R. Aves. Bridgeport, Conn.

The Precision Universal Tool Head

The Only Boring Tool that is Adjustable Without Stopping the Machine

A truly Universal Tool Head that has rendered all types of the once popular wrench-adjusted "Offset" or "Eccentric" boring tool entirely obsolete, as it brings all adjustments under absolute micrometric control of the operator at all times and at all speeds without stopping tool or machine. By a mere turn of the wrist the cutting tool is instantly adjusted to a fraction of a thousandth for boring, or fed continuously across or into the work for facing or recessing.



It is not only the fastest and most accurate boring tool in existence, but is far more than that as it also faces, counterbores, turns outside diameters of hubs and bosses, recesses, mills flat surfaces and slots, undercuts, back-faces, trepans and does countless "headache" jobs that wrench-adjusted boring tools cannot do because they cannot be adjusted while running.

Eight operations performed at one setting on hub on awkward two-ton casting in 72 minutes. No special tools or set-ups required. Let us solve your difficult problems. Write for Bulletins.

THE PRECISION TOOL COMPANY
P.O. BOX 155, BROOKLYN, NEW YORK
Cables: PRETOOL-NEW YORK Tel. MAin 4-1064

INVESTIGATE

. . . Shore's Improved Portable Scleroscope Testing Set, Model C-2, Speedy, non-destructive. The World's Standard Hardness Tester since 1907, is still effective and popular.

•

Write for Circular!

•

THE SHORE INSTRUMENT & MANUFACTURING CO., INC.

9025 Van Wyck Ave., Jamaica, N. Y.

Jamaica 6-4090

No Sharp Corners

The Gray & Prior Universal Joint is mechanically perfect in load transmission. Friction and wear are minimized by eliminating screws and small parts and by rounding contact edges. Circular upon request.

The Gray & Prior Machine Co.

69 Suffield St., Hartford, Conn., U. S. A.

OSLUND

UNIVERSAL INDICATOR

Indicator furnished with Case and Attachments **$9.50** Each

The only indicator with 360o reading face. Scale is easily read in any position. Accurate and quick in any set-up. Readings can be taken without mirrors when indicator is used upside-down or facing towards back of machine.

Oslund Tool & Die Co., 14 Sigourney St., Hartford, Conn.

Send for Illustrated Pamphlet.

The **GEMCO KEYSEATER** • **BENCH AND FLOOR TYPE**

This inexpensive compact Keyseater will accurately do the work of a high priced power-driven machine. It will cut Keyways ½" to 2⅜" bore as standard; or if desired larger bores can be arranged. Keyways up to 7" in length, either straight or taper can be made at minimum cost.

The Following Cutters Are Standard on THE GEMCO

With the ½" bar: ¼" and 3/16" Cutters.
With the ¾" bar: 3/16", ¼" and 5/16" Cutters.
With the 1" bar: ¼", 5/16", ⅜", 7/16" and ½" Cutters.

Cutters also in thirty-second sizes.

Write for sizes, prices and information.

GIBRALTAR EQUIPMENT & MFG. CO.

Madison at 14th St. St. Louis, Missouri

WHERE-TO-BUY DIRECTORY

** Indicates further information to be found in advertising pages.*

INDICATORS, Dial (see GAGES, Dial)

INDICATORS, Speed
Amthor Testing Inst. Co., Brooklyn, N. Y.
Bristol Co., Waterbury, Conn.
*Brown & Sharpe Mfg. Co., Providence, R. I.
*Brown Inst. Co., Philadelphia, Pa.
Scherr Co., Inc., Geo., N. Y. C.
*Starrett Co., L. S., Athol, Mass.
*Veeder-Root, Inc., Hartford, Conn.
Weston Electrical Inst. Corp., Newark, N. J.
Zeiss Inc., Carl, N. Y. C.

INDICATORS, Temperature
Bristol Co., Waterbury, Conn.
*Brown Instrument Co., Philadelphia, Pa.
Foxboro Co., Foxboro, Mass.
Leeds & Northrup Co., Philadelphia, Pa.
Marsh Corp., Jas. P., Chicago
Partlow Corp., New Hartford, N. Y.
Taglialue Mfg. Co., C. J., Brooklyn, N. Y.
Taylor Instrument Co., Rochester, N. Y.
Thwing-Albert Instrument Co., Philadelphia, Pa.
Weston Electrical Inst. Corp., Newark, N. J.

INSTRUMENTS, Hardness-Measuring
Bausch & Lomb Optical Co., Rochester, N. Y.
Detroit Testing Machine Co., Detroit
Olsen Testing Machine Co., Tinius, Philadelphia
Pyro-Electric Instrument Co., Detroit
*Shore Inst. & Mfg. Co., Jamaica, N. Y.
Thwing-Albert Instrument Co., Philadelphia
*Wilson Mechanical Inst. Co., N. Y. C.

ISOLATORS, Vibration
Columbian Rope Co., Auburn, N. Y.

JACKS, Hand Lift
All Steel Welded Truck Corp., Rockford, Ill.
Blackhawk Mfg. Co., Milwaukee, Wis.
Duff-Norton Mfg. Co., Pittsburgh, Pa.
Joyce-Cridland Co., Dayton, O.
Templeton, Kenley & Co., Chicago
Yale & Towne Mfg. Co., Philalelphia

JACKS, Hydraulic
American Grinder & Specialty Corp., Fond du Lac, Wis.
Blackhawk Mfg. Co., Milwaukee, Wis.
Buda Co., Harvey, Ill.
Dudgeon, Richard, Inc., N. Y. C.
General Electric Co., Schenectady, N. Y.
Hein-Werner Motor Parts Corp., Waukesha, Wis.
Henderer's, A. L., Sons, Wilmington, Del.
Joyce-Cridland Co., Dayton, O.
Logansport Machine, Inc., Logansport, Ind.
Messinger Bearings, Inc., Philadelphia
Millers Falls Co., Greenfield, Mass.
Rochester Machine Co., Rochester, Pa.
Walker Mfg. Co., Racine, Wis.
*Watson-Stillman Co., Roselle, N. J.

JACKS, Machinist's
*Armstrong Bros., Tool Co., Chicago
*Brown & Sharpe Mfg. Co., Providence, R. I.
Duff-Norton Mfg. Co., Pittsburgh, Pa.
*Lufkin Rule Co., Saginaw, Mich.
*Starrett Co., L. S. Athol, Mass.
Templeton, Kenley & Co., Chicago, Ill.

JIG-BORING Machines
Baker Bros., Inc., Toledo, O.
*Cincinnati Bickford Tool Co., Oakley, Cincinnati
*Cleereman Machine Tool Co., Green Bay, Wis.
*Fosdick Machine Tool Co., Cincinnati, O.
*Giddings & Lewis Mach. Tool Co., Fond du Lac, Wis.
*Knight Machinery Co,, W. B., St. Louis
*Linley Brothers Co., Bridgeport, Conn.
Marburg Brothers Inc., N. Y. C.
Moore Special Tool Co., Inc., Bridgeport, Conn.
*Pratt & Whitney Co., Div. Niles-Bement-Pond Co., Hartford, Conn.
*Reed-Prentice Corp., Worcester, Mass.
Schuyler Co., W. A., N. Y. C.

JIGS & FIXTURES (see also CONTRACT WORK pages 367-372)

JIGS, Quick-Acting
Cleveland Universal Jig Co., Cleveland, O.
Columbus Die, Tool & Machine Co., Columbus, O.
Esco Engrg. Service Co., Toledo, O.

JOINTS, Universal
Apex Mach. & Tool Co., Dayton, O.
Borg-Warner Corp., Rockford, Ill.
Borgeson Mfg. Co., Bridgeport, Conn.
Boston Gear Works, Inc., N. Quincy, Mass.
*Gray & Prior Machine Co., Hartford, Conn.
Hanson Clutch & Machinery Co., Tiffin, O.
Link-Belt Co., Chicago
National Automatic Tool Co., Richmond, Ind.
*Philadelphia Gear Works, Philadelphia

KEYS, Machine
Moltrup Steel Products Co., Beaver Falls, Pa.
Morton Mfg. Co., Muskegon Heights, Mich.
Rockwood Mfg. Co., Indianapolis, Ind.
Taylor Mfg. Co., Philadelphia, Pa.
Whitney Chain & Mfg. Co., Hartford, Conn.

KEYSEATERS
*American Broach & Machine Co., Ann Arbor, Mich.
Baker Bros., Inc., Toledo, O.
*Consolidated Machine Tool Corp., Rochester, N. Y.
*Davis Keyseater Co., Rochester, N. Y.
*General Machinery Corp., Hamilton, O.
*Gibraltar Equipment Mfg. Co., St. Louis, Mo.
*Lapointe Machine Tool Co., Hudson, Mass.
*Mitts & Merrill, Saginaw, Mich.
Morton Mfg. Co., Muskegon Heights, Mich.
*National Machine Tool Co., Cincinnati, O.
Nixon Gear & Machine Co., Syracuse, N. Y.
*Reed-Prentice Corp., Worcester, Mass.

KNIVES, Shear
*Atkins & Co., E. C., Indianapolis, Ind.
*Cincinnati Shaper Co., Cincinnati
*Cleveland Punch & Shear Works Co., Cleveland
Colonial Broach Co., Detroit, Mich.
Columbia Machine Tool Co., Hamilton, O.
*Disston & Sons, Inc., Henry, Tacony, Philadelphia, Pa.
Haynes Stellite Co., Kokomo, Ind.
Heppenstall Co., Pittsburgh, Pa.
Mesta Machine Co., Pittsburgh, Pa.
*Michigan Tool Co., Detroit, Mich.
*Niagara Machine & Tool Works, Buffalo, N. Y.
Peck, Stow & Wilcox Co., Southington, Conn.

"ROCKWELL" HARDNESS TESTER *Hand and Motorized Models*

These testers are the exclusive product of our factory

743 E. 143 St., N. Y. **WILSON** MECHANICAL INSTRUMENT CO. INC.

WHERE-TO-BUY DIRECTORY

** Indicates further information to be found in advertising pages.*

*Simonds Saw & Steel Co., Fitchburg, Mass.

KNURLS & KNURL HOLDERS
*American Swiss File & Tool Co., Elizabeth, N. J.
*Armstrong Bros. Tool Co., Chicago
Billings & Spencer Co., Hartford, Conn.
*Brown & Sharpe Mfg. Co., Providence, R. I.
*Graham Mfg. Co., Providence, R. I.
*Pratt & Whitney Div. Niles-Bement-Pond Co., Hartford, Conn.
Reed Small Tool Works, 237 Chandler St., Worcester, Mass.
Western Tool & Mfg. Co., Springfield, O.
*Williams & Co., J. H., Buffalo, N. Y.

LACERS, Belt
Armstrong-Bray & Co., Chicago, Ill.
Clipper Belt-Lacer Co., Grand Rapids, Mich.
Detroit Belt Lacer Co., Detroit, Mich.
Safety Belt Lacer Co., Toledo, O.

LAMPS, Machine & Bench
Adjustable Fixture Co., Milwaukee, Wis.
Faries Mfg. Co., Decatur, Ill.
Fostoria Pressed Steel Corp., Fostoria, O.
Klemm Reflector Co., Philadelphia, Pa.
McFaddin & Co., H. C. N. Y. C.
Multiple-Socket Fixture Co., Cleveland, O.
Sampson Axcess System, Inc., Lynn, Mass.
White Co., O. C., Worcester, Mass.

LAPPERS, Centerless
*Cincinnati Grinders, Inc., Cincinnati, O.
Production Machine Co., Greenfield, Mass.

LAPPERS, Cylindrical & Flat
*Ex-Cell-O Corp., Detroit, Mich.
*Foster Machine Co., Elkhart, Ind. (Superfinishing)
*Moline Tool Co., Moline, Ill.
*Norton Co., Worcester, Mass. (also Superfinishing)
Schraner & Co., A. P., Cleveland, O.
*Sellers & Co., Inc., Wm., Philadelphia

LAPPERS, Gear
*American Tool Works Co., Cincinnati, O.
Colonial Broach Co., Detroit, Mich.
*Farrel-Birmingham Co., Buffalo, N. Y.
*Fellows Gear Shaper Co., Springfield, Vt.
Gear Processing, Inc., Cleveland, O.
*Gleason Works, Rochester, N. Y.
*Lehmann Machine Co., St. Louis, Mo.
Marburg Bros., Inc., N. Y. C.
*Michigan Tool Co., Detroit, Mich.
*Natl. Broach & Machine Co., Detroit

LAPS, Toolmaker's
Boyer-Campbell Co., Detroit, Mich.
*Brown & Sharpe Mfg. Co., Providence, R. I.
*Lufkin Rule Co., Saginaw, Mich.
*Producto Machine Co., Bridgeport, Conn.
*Starrett, L. S., & Co., Athol, Mass.

LATHES, Automatic & Semi-Automatic
Automatic Machine Co., Bridgeport, Conn.
Baird Machine Co., Bridgeport, Conn.
*Bullard Co., Bridgeport, Conn.
*Cleveland Automatic Mach. Co., Cleveland
Cosa Oversea Trading Corp., New York, N. Y.
*Foster Machine Co., Elkhart, Ind.
*Gisholt Machine Co., Madison, Wis.
*Gosa & deLeeuw Machine Co., New Britain, Conn.
*Jones & Lamson Machine Co., Springfield, Vt.
*Kingsbury Machine Tool Corp., Keene, N. H.
*LeBlond Machine Tool Co., R. K., Cincinnati
Lipe, W. C., Syracuse, N. Y.
*Lodge & Shipley Machine Tool Co., Cincinnati
*Monarch Machine Tool Co., Sidney, O.
*National Acme Co., Cleveland
*New Britain Gridley Mach. Div., New Britain, Conn.
*Potter & Johnston Machine Co., Pawtucket, R. I.
*Pratt & Whitney Div. Niles-Bement-Pond Co., Hartford, Conn.
*Reed-Prentice Co., Worcester, Mass.
*Rockford Machine Tool Co., Rockford, Ill.
Schuyler, W. A., N. Y. C.
Sebastian Lathe Co., Cincinnati, O.
*Seneca Falls Machine Co., Seneca Falls, N. Y.
Sparks Simplex Machinery Corp., New York, N. Y.
*Sundstrand Machine Tool Co., Rockford, Ill.
*Warner & Swasey Co., Cleveland, O.
Wickes Bros., Saginaw, Mich.

LATHES, Bench
*Ames Co., B. C., Waltham, Mass.
Atlas Press Co., Kalamazoo, Mich.
*Bradford Machine Tool Co., Cincinnati
Brown Machine Co., Chicago, Ill.
Champion Blower & Forge Co., Harrisburg Ave., Lancaster, Pa.
Cosa Oversea Trading Corp., New York, N. Y.
*Gisholt Machine Co., Madison, Wis.
*Hardinge Brothers, Inc., Elmira, N. Y.
*LeBlond Machine Tool Co., R. K., Cincinnati, O.
*Pratt & Whitney Div. Niles-Bement-Pond Co., Hartford, Conn.
*Rivett Lathe & Grinder, Inc., Brighton, Boston, Mass.
Schauer Machine Co., Cincinnati, O.
Sebastian Lathe Co., Cincinnati, O.
*Seneca Falls Machine Co., Seneca Falls, N. Y.
Sheldon Machine Co., Chicago
*Sidney Machine Tool Co., Sidney, O.
*South Bend Lathe Works, S. Bend, Ind.
Stark Tool Co., Waltham, Mass.
*Wade Tool Co., Waltham, Mass.

LATHES, Crankshaft
*American Tool Works Co., Cincinnati, O.
*Consolidated Machine Tool Corp., Rochester, N. Y.
Crankshaft Machine Co., Jackson, Mich.
*LeBlond Tool Machine Co., R. K., Cincinnati
*Lodge & Shipley Machine Tool Co., Cincinnati
*Potter & Johnston Machine Co., Pawtucket, R. I.
*Sundstrand Machine Tool Co., Rockford, Ill.
Sunnen Products Co., St. Louis, Mo.
Wickes Bros., Saginaw, Mich.

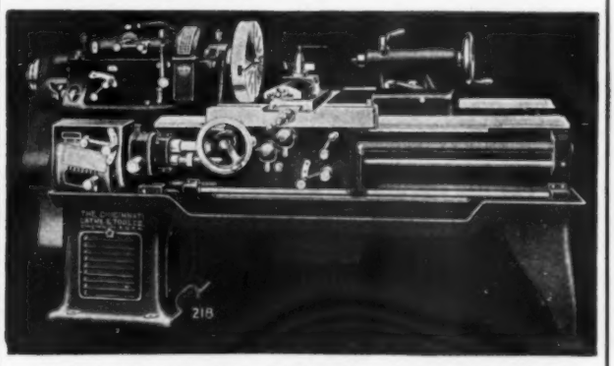
LATHES, Engine & Toolroom
*American Tool Works Co., Cincinnati, O.
Atlas Press Co., Kalamazoo, Mich.
*Axelson Mfg. Co., Vernon, Los Angeles, Cal.
*Boye & Emmes Machine Tool Co., Cincinnati, O.
*Bradford Machine Tool Co., Cincinnati
*Bryant Machinery & Engrg. Co., Chicago
Champion Blower & Forge Co., Lancaster, Pa.
*Cincinnati-Gilbert Machine Tool Co., Cincinnati
*Cincinnati Lathe & Tool Co., Oakley, Cincinnati, O.
*Consolidated Machine Tool Corp., Rochester, N. Y.
*General Machinery Corp. (Niles Tool Wks. Div.) Hamilton, O.
Gerard Machine Co., Inc., Newark, N. J.
*Gisholt Machine Co., Madison, Wis.
*Hardinge Brothers, Elmira, N. Y.
*Hendey Machine Co., Torrington, Conn.
*LeBlond Machine Tool Co., R. K., Cincinnati
*Lehmann Machine Co., St. Louis, Mo.
Lempco Products Inc., Bedford, O.
*Lodge & Shipley Machine Tool Co., Cincinnati
*Monarch Machine Tool Co., Sidney, O.
Morris Machine Tool Co., Cincinnati, O.
*Porter-McLeod Mach. Tool Co., Hatfield, Mass.
*Pratt & Whitney Div. Niles-Bement-Pond Co., Hartford, Conn.
*Reed-Prentice Co., Worcester, Mass.
*Rivett Lathe & Grinder, Inc., Brighton, Boston, Mass.
*Rockford Machine Tool Co., Rockford, Ill.
Sebastian Lathe Co., Cincinnati, O.
*Seneca Falls Machine Co., Seneca Falls, N. Y.
Sheldon Machine Co., Chicago, Ill.
*Sidney Machine Tool Co., Sidney, O.
*Simmons Machine Tool Corp., Albany, N. Y.
*South Bend Lathe Works, South Bend, Ind.

Cincinnati Lathes

THE PRODUCT OF 34 YEARS EXPERIENCE IN PRECISION MACHINE TOOL BUILDING

Guaranteed accurate within .001 inch, these modern lathes can be depended on to maintain this accuracy in long, hard service. They assure high efficiency and economy in tool room or production work involving exacting boring, turning or chasing.

Built in 14, 16, 18, 20, 22, 24, 27 and 30 inch sizes; 32 to 96 feed and thread changes; 12 to 24 spindle speeds obtainable by simply shifting the lever.



WRITE TODAY for latest Catalog giving complete, detailed specifications on every size lathe.

The Cincinnati Lathe & Tool Co.
OAKLEY, CINCINNATI, OHIO

WADE PRECISION BENCH LATHES

Designed especially for Modern Tool Rooms

MODERN tool room practice calls for the utmost in precision, to meet the needs of products designed for higher speed, smoother operation.

Wade Equipment is the result of over 30 years' experience in making precision equipment. It is known for long lived bearings, perfect alignment, perfect results.

A complete line of attachments can be furnished for milling, screw cutting, grinding, screw machine work, etc.

THE WADE TOOL CO.
Waltham, Mass.

DAVIS KEYSEATER

This low cost machine will handle any keyseating job in the shop up to 1¼ in.

Write for illustrated bulletin

DAVIS KEYSEATER CO., 403 Exchange St., Rochester, N. Y.

Giant KEYSEATERS

For cutting internal keyways, slots or splines 1/16" to 4" wide and up to 60" long. Fast—Accurate—Flexible. Write for particulars and catalog on machine for your work.

MITTS & MERRILL
913 Tilden St.
Saginaw, Michigan

WHERE-TO-BUY DIRECTORY

** Indicates further information to be found in advertising pages.*

LATHES, Engine & Toolroom (Cont.)
*Springfield Machine Tool Co., Springfield, O.
*Sundstrand Machine Tool Co., Rockford, Ill.
Wickes Bros., Saginaw, Mich.

LATHES, Extension Bed & Gap
*American Tool Works Co., Cincinnati, O.
*Cincinnati Lathe & Tool Co., Oakley, Cincinnati, O.
*General Machry. Corp. (Niles Tool Wks. Div.), Hamilton, O.
*Gisholt Machine Co., Madison, Wis.
*LeBlond Machine Tool Co., R. K., Cincinnati
*Lodge & Shipley Machine Tool Co., Cincinnati
*Nebel Machine Tool Co., Cincinnati, O.
Sebastian Lathe Co., Cincinnati, O.
*Seneca Falls Machine Co., Seneca Falls, N. Y.
*South Bend Lathe Works, South Bend, Ind.
*Warner & Swasey Co., Cleveland, O.

LATHES, Gun
*American Tool Works, Cincinnati, O.
*Consolidated Machine Tool Corp., Rochester, N. Y.
*General Machinery Corp. (Niles Tool Works Div.), Hamilton, O.
*LeBlond Machine Tool Co., R. K., Cincinnati
*Lodge & Shipley Machine Tool Co., Cincinnati

LATHES, Spinning
Bliss Co., E. W., Brooklyn, N. Y.
Ferracute Machine Co., E. Bridgeton, N. J.
Oliver Machinery Co., Grand Rapids, Mich.
Pryibil Machine Co., P., Long Island City, N. Y.
Toledo Machine & Tool Co., Toledo, O.

LATHES, Turret
*Acme Machine Tool Co., Cincinnati
*Bardons & Oliver, Inc., Cleveland
*Bullard Co., Bridgeport, Conn.
Cosa Oversea Trading Corp., New York, N. Y.
*Foster Mach. Co., Elkhart, Ind.
*General Machinery Corp. (Niles Tool Wks. Div.), Hamilton, O.
*Gisholt Machine Co., Madison, Wis.
*Goss & deLeeuw Machine Co., New Britain, Conn.
Greenlee Bros. & Co., Rockford, Ill.
*Hardinge Brothers, Inc., Elmira, N. Y.
*International Machine Tool Co., Indianapolis, Ind.
*Jones & Lamson Machine Co., Springfield, Vt.
*Millholland Sales & Mach. Co, Indianapolis, Ind.
*Monarch Machine Tool Co., Sidney, O.
*National Acme Co., Cleveland, O.
*Potter & Johnson Machine Co., Pawtucket, R. I.
*Simmons Machine Tool Corp., Albany, N. Y.
*Springfield Machine Tool Co., Springfield, O.
Stark Tool Co., Waltham, Mass.
*Warner & Swasey Co., Cleveland

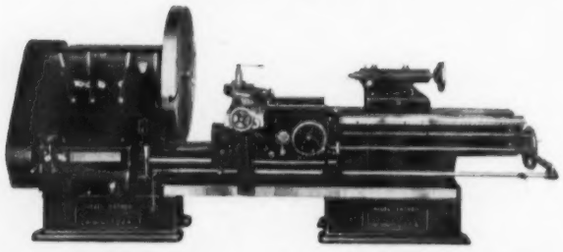
LEVELS, Precision
*Brown & Sharpe Mfg. Co., Providence, R. I.
*Pratt & Whitney Div. Niles-Bement-Pond Co., Hartford, Conn.
*Starrett Co., L. S., Athol, Mass.
Universal Boring Machine Co., Hudson, Mass.

LIGHTING EQUIPMENT, Industrial
Adjustable Fixture Co., Milwaukee, Wis.
Benjamin Elec. Mfg. Co., Des Plaines, Ill.
Berger Mfg. Div., Republic Steel Corp., Canton, O.
Curtis Lighting, Inc., Chicago
Dazor Mfg. Corp., St. Louis, Mo.
General Electric Co., Nela Park, Cleveland, O.
General Electric Vapor Lamp Co., Hoboken, N. J.
Graybar Electric Co., Inc., New York, N. Y.
Guth Co., Edwin F., St. Louis, Mo.
Hanovia Chemical & Mfg. Co., Newark, N. J.
Hygrade Sylvania Corp., Salem, Mass.
Jefferson Electric Co., Bellwood, Ill.
Miller Co., Meriden, Conn.
Spanner Vapor Lamp Co., New York
Westinghouse Electric & Mfg. Co. (Lighting Div.), Cleveland
Westinghouse Lamp Co., New York, N. Y.
Zagora Machine & Gear Co., Charlotte, N. C.

LOCK NUTS
Adapti Co., Cleveland, Ohio
American Nut & Bolt Fastener Co., Pittsburgh, Pa.
Anti-Corrosive Metal Products Co., Inc., Castleton-on-Hudson, N. Y.
Appleton Electric Co., Chicago, Ill.
Austin Co., M. B., Chicago, Ill.
Automatic Nut Corp., Inc., Lebanon, Pa.
Automotive Hardware, Inc., Indianapolis, Ind.
Bayonne Bolt Corp., New York City
*Bethlehem Steel Co., Bethlehem, Pa.
Blake & Johnson Co., Waterville, Conn.
Boss Bolt & Nut Co., Chicago, Ill.
Cadillac Bolt & Nut Co., Cadillac, Mich.
Cayouette Products Co., Cleveland, Ohio
Chicago Ferrule & Nut Co., Chicago, Ill.
Chicago Steel Tank Co., Chicago, Ill.
Columbia Nut & Bolt Co., Bridgeport, Conn.
Dardelet Threadlock Corp., New York City
Devlin Mfg. Co., Thos., W. Burlington, N. J.
Drake Lock-Nut Co., Cleveland, Ohio
Eaton Mfg. Co., Massillon, Ohio
Elastic Shop Nut Corp., Elizabeth, N. J.
Fafnir Bearing Co., New Britain, Conn.
Globe Metal Mfg. Co., Philadelphia, Pa.
Green Inc., R. H., Oakland, Calif.
Grinnell Co., Inc., Providence, R. I.
Grip Nut Co., Chicago, Ill.
Hobbs Mfg. Co., Worcester, Mass.
Industrial Lock Nut Co., South Hanover, Mass.
Kwikon Co., Chicago, Ill.
Lackner, R. J., Brooklyn, N. Y.
Lock Nut Corp. of America, Chicago, Ill.
MacLean-Fogg Lock Nut Co., Chicago, Ill.
Machinery Products Corp., Chicago, Ill.
Malleable Iron Fittings Co., Branford, Conn.
National Electric Products Corp., Pittsburgh, Pa.
National Machine Products Co., Detroit, Mich.
National Screw & Mfg. Co., Cleveland, Ohio
Neely Nut & Bolt Co., Pittsburgh, Pa.
Newbury & Son, Inc., Jay H., Goshen, N. Y.
Newbury Mfg. Co., Monroe, N. Y.
Palnut Co., Irvington, N. J.
Pheoll Mfg. Co., Chicago, Ill.
Rattan Mfg. Co., New Haven, Conn.
Ravena Iron Co., Ravena, N. Y.
Rawlplug Co., Inc., New York City
Richardson, Edro, Brass Co., Baltimore, Md.
Russell, Burdsall & Ward Bolt & Nut Co., Port Chester, N. Y.
Simmons Co., John, Long Island City, N. Y.
*Standard Pressed Steel Co., Jenkintown, Pa.
Steel City Electric Co., Pittsburgh, Pa.
Sterling Bolt Co., Chicago, Ill.
Terry Co., Andrew, Terryville, Conn.
Thomas & Betts Co., Elizabeth, N. J.
Tinnerman Stove & Range Co., Cleveland, Ohio
United Screw & Bolt Corp., Cleveland, Ohio
Valley Steel Products Co., St. Louis, Mo.
Walworth Co., New York City
Whittet & Higgins Co., Inc., Providence, R. I.
Woodings-Verona Tool Works, Verona, Pa.

LOCKERS & SHELVING
All-Steel-Equip., Aurora, Ill.
All Steel Welded Truck Corp., Rockford, Ill.
Aurora Steel Prods. Co., Aurora, Ill.
Berger Mfg., Div. Republic Steel Corp., Canton, O.
Cincinnati Tool Co., Cincinnati, O.
Curran Machine Works, Long Island City, N. Y.
Diagraph-Bradley Stencil Mach. Co., St. Louis, Mo.
Durabilt Steel Locker Co., Aurora, Ill.
Frick-Gallagher Mfg. Co., Wallston, O.
General Fireproofing Co., Youngstown, O.
Gerstner & Sons, H., Dayton, O.
Hall Co., Gordon L., Old Lyme, Conn.
Koven & Bros. Co., Inc., L. D., Jersey City
Lyon Metal Products Co., Aurora, Ill.
Noggle Products Co., Ann Arbor, Mich.
Palmer-Bee Co., Detroit, Mich.
Ro-Tray Corp., Washington, D. C.

SPEED—EFFICIENCY—PRODUCTIVITY *with*



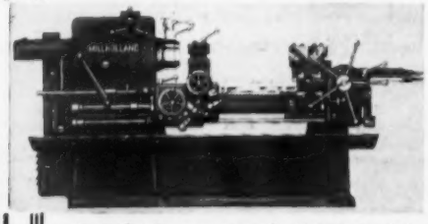
NEBEL LATHES

If your production bottleneck is in your lathe department, investigate NEBEL Cone and Geared Head, Engine Gap and Extension Bed Gap Lathes. Available in 16" to 50" swing these lathes will step up your production. Our 40 years of lathe construction experience has been built into these machines so that they can be depended on to stand up under any demands that may be made upon them.

Write *today* for a copy of our catalog giving complete details and specifications of the complete line.

THE NEBEL MACHINE TOOL CO.
(FORMERLY THE RAHN-LARMON CO.)
CINCINNATI, OHIO

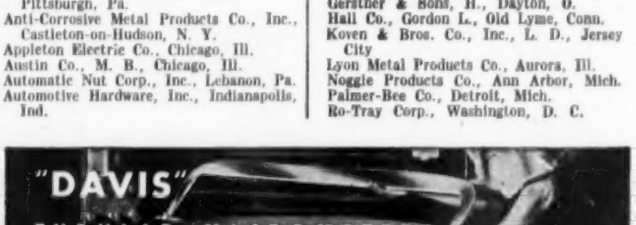
Improved **MILLHOLLAND NO. 4**
RAM TYPE UNIVERSAL TURRET LATHE



Designed to assure greater rigidity

Bed mounted on box section sub-base with chip pan mounted on separate ledge between to maintain accuracy of alignment. Swing 20" over ways; furnished in 2" and 2½" bar capacity. Also other sizes available. Write for detailed specifications.

W. K. MILLHOLLAND MACHINERY CO.
INDIANAPOLIS . . . . . INDIANA



WHERE-TO-BUY DIRECTORY

** Indicates further information to be found in advertising pages.*

Security Metal Products, Inc., Kalamazoo, Mich.
Stackbin Corp., Providence, R. I.
Union Drawn Steel Div., Republic Steel Corp., Massillon, O.

LUBRICANTS
Acheson Colloids Corp., Port Huron, Mich.
Alemite Div., Stewart-Warner Corp., Chicago
Alox Corp., Niagara Falls, N. Y.
Cities Service Co., N. Y. C.
Dixon Crucible Co., Jos., Jersey City, N. J.
Gulf Oil Corp., Pittsburgh
*Houghton & Co., E. F., Philadelphia
Keystone Lubricating Co., Philadelphia
*Oakite Products, Inc., N. Y. C.
Pure Oil Co., Chicago
Shell Oil Corp., N. Y. C.
*Socony-Vacuum Oil Co., N. Y. C.
*Standard Oil Co. of Ind., Chicago
*Stuart Oil Co., D. A., Chicago
*Sun Oil Co., Philadelphia, Pa.
Swan-Finch Oil Corp., N. Y. C.
*Texas Co., N. Y. C.
Tidewater Oil Co., N. Y. C.
U. S. Graphite Co., Saginaw, Mich.
Van Cleef Bros., Chicago

LUBRICATING SYSTEMS
Alemite Div., Stewart-Warner Corp., Chicago
American Cable Div., Am. Chain & Cable Co., Bridgeport, Conn.
Bijur Lubricating Corp., L. I. City, N. Y.
Bowen Products Corp., Detroit, Mich.
Cincinnati Ball & Crank Co., Cincinnati
*De Laval Separator Co., N. Y. C.
Essex Brass Corp., Detroit, Mich.
Farval Corp., Cleveland, O.
Gits Bros. Mfg. Co., Chicago
Keystone Lubricating Co., Philadelphia
Madison-Kipp Corp., Madison, Wis.
Pressurelube, Inc., N. Y. C.
*Rivett Lathe & Grinders, Inc., Brighton, Boston, Mass.
Speedway Mfg. Co., Cicero, Ill.
Trico Fuse Co., Milwaukee, Wis.

MAGNETIC TESTING MACHINES
Magnaflux Corp., Chicago

MAGNETS, Lifting
Cutler Hammer, Inc., Milwaukee, Wis.
Dings Magnetic Separator Co., Milwaukee
Electric Controller & Mfg. Co., Cleveland, O.
General Electric Co., Schenectady, N. Y.
Ohio Electric Mfg. Co., Cleveland, O.
Stearns Magnetic Mfg. Co., Milwaukee, Wis.

MALLETS (see **TOOLS, Hand**)

MANDRELS, Expanding
*Cleveland Twist Drill Co., Cleveland, O.
Cushman Chuck Co., Hartford, Conn.
Davis Boring Tool Div., Larkin Packer Co., St. Louis, Mo.
*Gisholt Machine Co., Madison, Wis.
Hannifin Mfg. Co., Chicago, Ill.
Lee & Son Co., K. O., Aberdeen, S. D.
Morse Twist Drill & Machine Co., New Bedford, Mass.
Nicholson & Co., W. H., Wilkes-Barre, Pa.
*Producto Machine Co., Bridgeport, Conn.
*Scully-Jones & Co., Chicago
*Tomkins-Johnson Co., Jackson, Mich
Western Tool & Mfg. Co., Springfield, O.

MANDRELS, Solid
*Atkins, E. C. & Co., Indianapolis, Ind.
*Brown & Sharpe Mfg. Co., Providence, R. I.
*Carboloy Co., Detroit, Mich.
*Cleveland Twist Drill Co., Cleveland, O.
Cochrane-Bly Co., Rochester, N. Y.
Cushman Chuck Co., Hartford, Conn.
Davis Boring Tool Div., Larkin Packer Co., St. Louis, Mo.
*Disston & Sons, Inc., Henry, Tacony, Philadelphia
*Firth-Sterling Steel Co., McKeesport, Pa.
*Gisholt Machine Co., Madison, Wis.
Greenfield Tap & Die Corp., Greenfield, Mass.
Hannifin Mfg. Co., Chicago
*Illinois Tool Works, Chicago
*Jacobs Mfg. Co., Hartford, Conn.
Lee & Son Co., K. O., Aberdeen, S. D.
*Michigan Tool Co., Detroit, Mich.
Morse Twist Drill & Machine Co., New Bedford, Mass.
*National Twist Drill & Tool Co., Detroit
Nicholson & Co., W. H., Wilkes-Barre, Pa.
*Pratt & Whitney Div., Niles-Bement-Pond Co., Hartford, Conn.
*Scully-Jones & Co., Chicago
Standard Tool Co., Cleveland
Super Tool Co., Detroit, Mich.
*Union Twist Drill Co., Athol, Mass.
*Universal Engrg. Co., Frankenmuth, Mich.
Whitman & Barnes, Detroit, Mich.

MARKING Machines
Acromark Co., Elizabeth, N. J.
Brewster & Co., Wm., New York, N. Y.
*Gorton Machine Co., Geo., Racine, Wis.
Minster Machine Co., Minster, O.
*Noble & Westbrook Mfg. Co., East Hartford, Conn.
Numberall Stamp & Tool Co., Huguenot Park, N. Y.
Preis Engraving Machine Co., H. P., Newark, N. J.

MATERIALS, Non-Metallic
Continental-Diamond Fibre Co., Newark, Del.

MASKS (See RESPIRATORS)

METAL-CLEANING Equipment
American Foundry Equipment Co., Mishawaka, Ind.
Barrett Co., Leon J., Worcester, Mass.
Blakeslee & Co., G. S., Cicero Sta., Chicago
*Bullard Co., Bridgeport, Conn.
Colt's Patent Fire Arms Mfg. Co., Hartford, Conn.
Detroit Rex Products Co., Detroit, Mich.
Hobart Bros. Co., Troy, O.
Meaker Co., Chicago
Mesta Machine Co., Pittsburgh, Pa.
Metalwash Machinery Co., Inc., N. Y. C.
Pangborn Corp., Hagerstown, Md.
Phillips Mfg. Co., Chicago
Ransohoff, Inc., N., Cincinnati
Stow Mfg. Co., Inc., Binghamton, N. Y.
*Tolhurst Centrifugal Div., American Mach. & Metals Inc., East Moline, Ill.

METALS, Bearing
Amplex Corp. Div. of Chrysler Corp., Detroit, Mich.
*Bunting Brass & Bronze Co., Toledo, O.
Gardiner Metal Co., Chicago
Glaser Lead Co., Brooklyn, N. Y.
*Johnson Bronze Co., New Castle, Pa
Moccasin Bushing Co., Chattanooga, Tenn.
Mueller Brass Co., Port Huron, Mich.
New Jersey Zinc Co., N. Y. C.
Oman Metals Corp., Chicago
*Ryerson & Son, Jos. T., Chicago
*Westinghouse Electric & Mfg. Co., E. Pittsburgh, Pa.

MICROMETERS
Bath & Co., John, Worcester, Mass.
*Brown & Sharpe Mfg. Co., Providence, R. I.
Cosa Oversea Trading Corp., New York, N. Y.
*Davis & Thompson Co., Milwaukee, Wis.
*Federal Products Corp., Providence, R. I.
Instrument Specialties Co., Little Falls, N. J.
*Lufkin Rule Co., Saginaw, Mich.
Manheim Co., Inc., K., N. Y. C.
Millers Falls Co., Greenfield, Mass.
*Pacific Tool & Supply Co., Los Angeles
*Randall & Stickney, Waltham, Mass.
Reed Small Tool Works, 40 Dewey St., Worcester, Mass.
Scherr Co., Inc., George, N. Y. C.
*Slocomb Co., J. T., Providence, R. I.
*Starrett Co., L. S., Athol, Mass.
Swedish Gage Co., of America, Detroit
*Taft-Peirce Mfg. Co., Woonsocket, R. I.
Van Keuren Co., Watertown, Mass.
Zeiss Inc., Carl, N. Y. C.

MICROSCOPES
Bausch & Lomb Optical Co., Rochester, N. Y.
Micro Instrument Co., Cambridge, Mass.
Scherr Co., Geo., N. Y. C.
Zeiss, Inc., Carl, N. Y. C.

MILLERS, Automatic
American Machine Tool Co., Hackettstown, N. J.
Automatic Machine Co., Bridgeport, Conn.
*Brown & Sharpe Mfg. Co., Providence, R. I.
*Cincinnati Milling Machine Co., Cincinnati
*Consolidated Machine Tool Corp., Rochester, N. Y.
Cosa Oversea Trading Corp., New York, N. Y.
Ingersoll Milling Machine Co., Rockford, Ill.
*Kearney & Trecker Corp., Milwaukee
Kent-Owens Machine Co., Toledo, O.
*Producto Machine Co., Bridgeport, Conn.
*Sundstrand Machine Tool Co., Rockford, Ill.
U. S. Tool Co., Ampere, N. J.

MILLERS, Bench
*Ames Co., B. C., Waltham, Mass.
Burke Machine Tool Co., Conneaut, O.
*Hardinge Brothers, Inc., Elmira, N. Y.
*Linley Bros. Co., Bridgeport, Conn.
*Pratt & Whitney Div., Niles-Bement-Pond Co., Hartford, Conn.
*Producto Machine Co., Bridgeport, Conn.
Stark Tool Co., Waltham, Mass.
*Sundstrand Mach. Tool Co., Rockford, Ill.

MILLERS, Duplex
*Cincinnati Milling Machine Co., Cincinnati, O.
Cochrane-Bly Co., Rochester, N. Y.
*Consolidated Machine Tool Corp., Rochester, N. Y.
*Davis & Thompson Co., Milwaukee, Wis.
Defiance Machine Works, Defiance, O.
Fitchburg Engrg. Corp., Fitchburg, Mass.
*General Machinery Corp. (Niles Tool Wks. Div.), Hamilton, O.
Ingersoll Milling Machine Co., Rockford, Ill.
*Kearney & Trecker Corp., Milwaukee
*Producto Machine Co., Bridgeport, Conn.
*Sundstrand Machine Tool Co., Rockford, Ill.
*Snyder Tool & Engrg. Co., Detroit, Mich.
Taylor & Fenn Co., Hartford, Conn.

MILLERS, Hand
Automatic Machine Co., Bridgeport, Conn.
*Brown & Sharpe Mfg. Co., Providence, R. I.
Frew Machine Co., Philadelphia, Pa.
*Hardinge Brothers, Inc., Elmira, N. Y.
Kent-Owens Machine Co., Toledo, O.
Miller & Crowningshield, Greenfield, Mass.
Nichols, W. H., Waltham, Mass.
*Producto Machine Co., Bridgeport, Conn.
Stark Tool Co., Waltham, Mass.
*Sundstrand Machine Tool Co., Rockford, Ill.
*Van Norman Machine Tool Co., Springfield, Mass.

MILLERS, Plain & Universal
*Brown & Sharpe Mfg. Co., Providence, R. I.
*Cincinnati Milling Machine Co., Cincinnati, O.
Cochrane-Bly Co., Rochester, N. Y.
*Douglas Machinery Co., Inc., New York, N. Y.
*Fray Mach. Tool Co., Glendale, Calif.
*Gorton Machine Co., Geo., Racine, Wis.
*Hardinge Brothers, Inc., Elmira, N. Y.
Ingersoll Milling Machine Co., Rockford, Ill.
*Kearney & Trecker Corp., Milwaukee
Kempsmith Machine Co., New York, N. Y.
Kent-Owens Machine Co., Toledo, O.
*Knight Machinery Co., W. B., St. Louis
Nichols, W. H., Waltham, Mass.
Preis Engraving Machine Co., Newark, N. J.

KEMPSMITH
MILLING MACHINES
TYPE G, No. 1 and 2 PLAIN and UNIVERSAL
ALL GEARED • MOTOR IN BASE
EXPORT DEPT. — EASTERN STATES DISTRIBUTORS
ATLANTIC MACHINERY CORPORATION
149 BROADWAY, NEW YORK CITY
CABLE ADDRESS — KEMPSMITH NEW YORK

NEW INSIDE MICROMETER

Write for fully descriptive literature
Nice Workmanship, Highest Accuracy
1½-12", 1½-6" in polished hardwood case. Workmanship and accuracy unconditionally guaranteed.
Telescope Gauges ½"-2¼" range—nicely made. Set of 3 in leatherette case $4.80.
PACIFIC TOOL & SUPPLY CO.
344 North Vermont Ave. Los Angeles, Calif.

Reduce Marking Costs
N & W rapid production marking machines increase production as much as 500%. Higher speeds, two or more operations at once, rolling process for clearer marking. Write for information.
The Noble & Westbrook Mfg. Co.
Specialists in Rapid, Precision Marking Equipment
17 Westbrook Street, East Hartford, Conn.

WHERE-TO-BUY DIRECTORY

** Indicates further information to be found in advertising pages.*

MILLERS, Plain & Universal (Cont.)
*Producto Machine Co., Bridgeport, Conn.
*Sidney Machine Tool Co., Sidney, O.
*Sundstrand Machine Tool Co., Rockford, Ill.
*Van Norman Machine Tool Co., Springfield, Mass.

MILLERS, Planer-Type
*Cincinnati Planer Co., Oakley, Cincinnati Ohio
*Consolidated Machine Tool Corp., Rochester, N. Y.
Fitchburg Engrg. Corp., Fitchburg, Mass.
*General Machinery Corp. (Niles Tool Wks. Div.), Hamilton, O.
*Giddings & Lewis Machine Tool Co., Fond du Lac, Wis.
*Gray Co., G. A., Cincinnati, O.
Ingersoll Milling Machine Co., Rockford, Ill.
*Kearney & Trecker Corp., Milwaukee, Wis.
*Sellers & Co., Inc., Wm., Philadelphia
Stokerunit Corp., Milwaukee, Wis.

MILLERS, Planetary
Hall Planetary Co., Philadelphia, Pa.

MILLERS, Profile
Automatic Machine Co., Bridgeport, Conn.
*Consolidated Machine Tool Corp., Rochester, N. Y. (Newton Div.)
Cosa Oversea Trading Corp., New York, N. Y.
Frew Machine Co., Philadelphia, Pa.
*Gorton Machine Co., Geo., Racine, Wis.
*Knight Machinery Co., W. B., St. Louis
*Pratt & Whitney Div. Niles-Bement-Pond Co., Hartford, Conn.
Preis Engraving Machine Co., Newark, N. J.
*Producto Machine Co., Bridgeport, Conn.
*Reed-Prentice Corp., Worcester, Mass.
*Wade Tool Co., Waltham, Mass.

MILLERS, Thread
*Adams Co., Dubuque, Iowa
Automatic Machine Co., Bridgeport, Conn.
*Coulter Machine Co., James, Bridgeport, Conn.
Hall Planetary Co., Philadelphia, Pa.
*Hanson-Whitney Machine Co., Hartford, Conn.
*Lees-Bradner Co., Cleveland, O.
Marburg Brothers, Inc., N. Y. C.
*Pratt & Whitney Div. Niles-Bement-Pond Co., Hartford, Conn.
*Producto Machine Co., Bridgeport, Conn.
*Rivett Lathe & Grinder, Inc., Brighton, Boston, Mass.
Scherr Co., Inc., Geo., N. Y. C.
*Taft-Peirce Mfg. Co., Woonsocket, R. I.
*Waltham Machine Works, Waltham, Mass.

MILLERS, Vertical
*Blank & Buxton Machry. Co., Jackson, Mich.
*Brown & Sharpe Mfg. Co., Providence, R. I.
Bridgeport Pattern & Model Works, Bridgeport, Conn.
*Cincinnati Milling Machine Co., Cincinnati, O.
Cochrane-Bly Co., Rochester, N. Y.
*Consolidated Machine Tool Corp., Rochester, N. Y. (Newton Div.)
*General Machinery Corp., (Niles Tool Works Div.), Hamilton, O.
*Gorton Machine Co., Geo., Racine, Wis.
*Hardinge Bros., Inc., Elmira, N. Y.
Ingersoll Milling Machine Co., Rockford, Ill.
*Kearney & Trecker Corp., Milwaukee, Wis.
*Knight Machinery Co., W. B., St. Louis
*Linley Bros. Co., Bridgeport, Conn.
*Pratt & Whitney Div. Niles-Bement-Pond Co., Hartford, Conn.
*Producto Machine Co., Bridgeport, Conn.
*Reed-Prentice Corp., Worcester, Mass.
*Sidney Machine Tool Co., Sidney, O.
*Stark Tool Co., Waltham, Mass.
*Sundstrand Machine Tool Co., Rockford, Ill.
Taylor & Fenn Co., Hartford, Conn.
*Van Norman Machine Tool Co., Springfield, Mass.

MOLDING MACHINES, Plastic
*Adams Co., Dubuque, Iowa
Grotelite Co., Bellevue, Ky.
Hydraulic Press Mfg. Co., Mt. Gilead, O.
Kux-Lohner Machine Co., Chicago, Ill.
Osborn Mfg. Co., Cleveland, O.
Phoenix Machine Co., Cleveland, O.
*Reed-Prentice Corp., Worcester, Mass.
Standard Machinery Co., Mystic, Conn.
Stokes Mach. Co., F. J., Philadelphia
*Watson-Stillman Co., Roselle, N. J.

MOLDS, LEAD HAMMER
American Chasing & Modeling Co., New York, N. Y.
Battery Equipment & Supply Co., Chicago, Ill.
Baum's Metal Specialties, Kansas City, Mo.
Doty Co., Melvin F., Detroit, Mich.
Fanning Co., J. P., Brooklyn, N. Y.
Geuder, Paeschke & Frey Co., Milwaukee, Wis.
Horat, J., Lafayette, Ind.
Johnson Inc., Wm., Newark, N. J.
*Johnson Tool Co., Inc., Newark, N. J.
Manhattan Modeling & Chasing Co., New York, N. Y.
Margach Mfg. Co., New York, N. Y.
Metal Cast Products Co., New York, N. Y.
Modern Iron Works, Quincy, Ill.
N. B. C. Engraving Co., Inc., New York, N. Y.
Pioneer Mold Co., Cleveland, Ohio
Rapaprot Bros., Chicago, Ill.
Schwerdtle Stamp Co., Bridgeport, Conn.
Schweizer Co., Chas. K., St. Louis, Mo.
Snell, Inc., Wm., Newark, N. J.
Stevenson, Inc., Ashton G., Chicago, Ill.
Tietzman Engr. Co., Dayton, Ohio
Vulcan Mold & Iron Co., Latrobe, Pa.
Whistler & Sons, Inc., S. B., Buffalo, N. Y.

MOTORS, Electric
Allis Co., Louis, Milwaukee, Wis.
*Allis-Chalmers Mfg. Co., Milwaukee, Wis.
*Barber-Colman Co., Rockford, Ill.
Bodine Electric Co., Chicago
Century Electric Co., St. Louis, Mo.
Cleveland Elec. Motor Co., Cleveland, O.
Crocker-Wheeler Electric Mfg. Co., Ampere, N. J.
Delco Products Div. of General Motors Corp., Dayton, O.
Diehl Mfg. Co., Elizabethport, N. J.
*Dumore Co., Racine, Wis.
Emerson Electric Mfg. Co., St. Louis, Mo.
*Fairbanks, Morse & Co., Chicago
General Electric Co., Schenectady, N. Y.
Graybar Electric Co., Inc., New York, N. Y.
Harnischfeger Corp., Milwaukee, Wis.
*Howell Electric Motors Co., Howell, Mich.
Lincoln Electric Co., Cleveland, O.
Ohio Electric Mfg. Co., Cleveland
Peerless Electric Co., Racine, Wis.
Quality Hardware & Machine Corp., Chicago
*Reliance Elec. & Engrg. Co., Cleveland
Sterling Electric Motors, Inc., Los Angeles, Calif.
U. S. Electrical Motors Inc., Los Angeles, Calif.
Wagner Electric Corp., St. Louis, Mo.
*Wesche Electric Co., B. A., Cincinnati, O.
*Westinghouse Elec. & Mfg. Co., E. Pittsburgh, Pa.

MOTORS, Geared (see MOTORS, Electric)

MOTORS, Hydraulic (see also Pumps, Hydraulic)
Hydro-Power Systems, Inc., Pittsburgh
*Oilgear Co., Milwaukee, Wis.
*Racine Tool & Machine Co., Racine, Wis.
*Sundstrand Machine Tool Co., Rockford, Ill.
*Vickers, Inc., Detroit, Mich.

MOULDS, LEAD HAMMER
*Johnson Tool Co., East Providence, R. I.

NAMEPLATES
Acromark Co., Elizabeth, N. J.
Amer. Emblem Co., Inc., Utica, N. Y.
Dickey-Grabler Co., Cleveland, O.
Grammes & Sons, L. F., Allentown, Pa.
Imperial Brass Mfg. Co., Chicago, Ill.
Matthews & Co., Jos. H., Pittsburgh, Pa.
*Noble & Westbrook, Mfg. Co., Hartford, Conn.

NIBBLERS
*Campbell Div., Andrew C. (Amer. Chain & Cable Co.), Bridgeport, Conn.
Gray Mach. Co., Philadelphia, Pa.
*Mitts & Merrill, Saginaw, Mich.
Quickwork-Whiting Corp., Harvey, Ill.
*Savage Co., W. J., Knoxville, Tenn.
St. Louis Tool Co., St. Louis, Mo.

NOZZLES, Blast-Cleaning
American Fdry. Equipment Co., Mishawaka, Ind.
Binks Mfg. Co., Chicago
DeVilbiss Co., Toledo, O.
*Norton Company, Worcester, Mass.
Pangborn Corp., Hagerstown, Md.
Stoody Co., Whittier, Calif.

NOZZLES, Spray
Ace Value Co., N. Y. C.
Binks Mfg. Co., Chicago
Deister Concentrator Co., Ft. Wayne, Ind.
DeVilbiss Co., Toledo, O.
Eclipse Air Brush Co., Newark, N. J.
Link-Belt Co., Chicago
Morley Co., Kansas City, Mo.
Saylor Beall Mfg. Co., Detroit, Mich.
Spray Engrg. Co., Somerville, Mass.

NUMBERING MACHINES (see MARKING MACHINES)

NUT-BLANKING MACHINES
*Cleveland Automatic Machine Co., Cleveland, O.
*National Acme Co., Cleveland, O.
National Machinery Co., Tiffin, O.
*Potter & Johnston Machine Co., Pawtucket, R. I.
Waterbury Farrel Foundry & Machine Co., Waterbury, Conn.

OILERS, Automatic (see LUBRICATING SYSTEMS)

OILS, Cutting
Alox Corp., Niagara Falls, N. Y.
Cities Service Co., N. Y. C.
Gulf Oil Corp., Pittsburgh
Houghton & Co., E. F., Philadelphia, Pa.
Keystone Lubricating Co., Philadelphia
*Racine Tool & Machine Co., Racine, Wis.

WHERE-TO-BUY DIRECTORY

** Indicates further information to be found in advertising pages.*

Ridge Tool Co., Elyria, O.
Shell Oil Co. Inc., N. Y. C.
*Socony-Vacuum Oil Co., N. Y. C.
*Standard Oil Co. (Ind.), Chicago
*Stuart Oil Co., D. A., Chicago
Sulfo Corp. of America, Elizabeth, N. J.
*Sun Oil Co., Philadelphia, Pa.
Swan-Finch Oil Corp., N. Y. C.
*Texas Co., N. Y. C.
Tidewater Associated Oil Co., N. Y. C.

OILS & GREASES (see LUBRICANTS)

OILS, Quenching & Tempering
Cities Service Co., N. Y. C.
Gulf Oil Corp., Pittsburgh
Houghton & Co., E. F., Philadelphia, Pa.
Shell Oil Co. Inc., N. Y. C.
*Socony-Vacuum Oil Co., N. Y. C.
*Standard Oil Co. of (Ind.), Chicago
*Stuart Oil Co., D. A., Chicago
*Sun Oil Co., Philadelphia, Pa.
Swan-Finch Oil Corp., N. Y. C.
*Texas Co., N. Y. C.
Tidewater Oil Co., N. Y. C.

OVENS, Gas-Fired
Despatch Oven Co., Minneapolis, Minn.
Gehnrich Corp., L. I. City, N. Y.
Lancaster Iron Works, Lancaster, Pa.
Philadelphia Drying Machry. Co., Philadelphia, Pa.
Young Bros. Co., Detroit, Mich.

PACKING, Hydraulic
Alexander Bros., Philadelphia
Belmont Packing & Rubber Co., Phila.
Crane Packing Co., Chicago
Garlock Packing Co., Palmyra, N. Y.
Goodrich Co., B. F., Akron, O.
Graton & Knight Co., Worcester, Mass.
*Greene, Tweed & Co., N. Y. C.
Hewitt Rubber Corp., Buffalo, N. Y.
Houghton & Co., E. F., Philadelphia, Pa.
Hydraulic Press Mfg. Co., Mt. Gilead, O.
Jenkins Bros., N. Y. C.
Johns-Manville, N. Y. C.
Logansport Machine, Logansport, Ind.
Raybestos-Manhattan, Inc., Passaic, N. J.
Rhoads & Sons, J. E., Philadelphia, Pa.
*Watson-Stillman Co., Roselle, N. J.

PAINTS, Varnishes, etc.
Aluminum Industries, Inc., Cincinnati, O.
American Coppercote, Inc., N. Y. C.
Ault & Wiborg Corp., Cincinnati, Ohio
*Bakelite Corp., N. Y. C.
Dixon Crucible Co., Jos., Jersey City, N. J.
du Pont de Nemours & Co., E. I., Wilmington, Del.
General Plastics, Inc., No. Tonawanda, N. Y.
Goodrich Co., B. F., Akron, O.
Hague & Co., Inc., Alfred, Brooklyn, N. Y.
Hilo Varnish Corp., Brooklyn, N. Y.
Maas & Walstein, Newark, N. J.
Quigley Co., Inc., N. Y. C.
National Lead Co., N. Y. C.
New Jersey Zinc Co., N. Y. C.
Roxalin Flexible Lacquer Co., Elizabeth, N. J.
Sherwin-Williams Co., Cleveland, O.
Skybryte Co., Cleveland, O.
U. S. Gutta Percha Paint Co., Providene, R. I.
Vita-Var Corp., Newark, N. J.
Wet-X-Hale Paint Compound Co., N. Y. C.

PAPER & CLOTH, Abrasive
Abrasive Products, Inc., S. Braintree, Mass.
Armour Sandpaper Works, Chicago
Behr-Manning Corp., Troy, N. Y.
Carborundum Co., Naigara Falls, N. Y.
*Clover Mfg. Co., Norwalk, Conn.
Mid-West Abrasive Co., Detroit, Mich.
Minnesota Mining & Mfg. Co., St. Paul, Minn.
*Norton Co., Worcester, Mass.

PARALLELS
*Brown & Sharpe Mfg. Co., Providence, R. I.
Ford Motor Co., Johansson Div., Dearborn, Mich.
*Starrett Co., L. S., Athol, Mass.
*Taft-Peirce Mfg. Co., Woonsocket, R. I.
*Walker Co., O. S., Worcester, Mass.

PARTS, Precision (see also CONTRACT WORK, pages 367-372)
*Waltham Watch Co., Waltham, Mass.

PICKLING MACHINES (see METAL CLEANING EQUIPMENT)

PINS, Dowel & Taper
*Allen Mfg. Co., Hartford, Conn.
American Steel & Wire Co., Cleveland
Bard Mfg. Co., Royersford, Pa.
*Bethlehem Steel Co., Bethlehem, Pa.
*Danly Machine Specialties, Inc., Chicago, Ill.
*Die Supply Co., Cleveland, Ohio
Groov-Pin Corp., Union City, N. J.
Heim Co., Fairfield, Conn.
Morse Twist Drill & Machine Co., New Bedford, Mass.
*Pittsburgh Steel Co., Pittsburgh, Pa.
Townsend Co., New Brighton, Pa.
U. S. Tool Co., Inc., Ampere, N. J.

PIPE CUTTING & THREADING MACHINES
*Armstrong Bros. Tool Co., Chicago, Ill.
*Bardons & Oliver, Inc., Cleveland
Beaver Pipe Tools Inc., Warren, O.
Bridgeport Safety Emery Wheel Co., Bridgeport, Conn.
*Cleveland Automatic Machine Co., Cleveland, O.
Cochrane-Bly Co., Rochester, N. Y.
*Hill-Acme Co., Cleveland, O.
*Landis Machine Co., Inc., Waynesboro, Pa.
*Murchey Machine & Tool Co., Detroit
*Oster Mfg. Co., Cleveland
*Peerless Machine Co., Racine, Wis.
Pipe Machinery Co., Cleveland, O.
Rickert-Shafer Co., Erie, Pa.
Ridge Tool Co., Elyria, Ohio
Scherr Co., Inc., Geo., N. Y. C.
Schuyler Co., W. A., N. Y. C.
Stamets, Wm. K., Pittsburgh, Pa.
Toledo Pipe Threading Machine Co., Toledo, O.
Whitney Chain & Mfg. Co., Hartford, Conn.

PLANERS
Automatic Machine Co., Bridgeport, Conn.
*Cincinnati Planer Co., Oakley, Cincinnati
*Cleveland Planer Co., Cleveland, O.
*Cleveland Punch & Shear Works, Inc., Cleveland, Ohio
*Consolidated Machine Tool Corp., Rochester, N. Y.
*General Machinery Corp. (Niles Tool Wks. Div.), Hamilton, O.
*Gray Co., G. A., Cincinnati, O.
*Liberty Planer & Mfg. Co., Hamilton, O.
Mesta Machine Co., Pittsburgh, Pa.
*Niles Tool Works Co., Hamilton, O.
*Ohio Machine Tool Co., Kenton, O.
*Rockford Machine Tool Co., Rockford, Ill.
*Sellers & Co., Inc., Wm., Philadelphia

PLANERS, Plate
*Baldwin-Southwark Corp., Paschall, Philadelphia, Pa.
*Cleveland Punch & Shear Works Co., Cleveland, O.
*Consolidated Machine Tool Corp., Rochester, N. Y.
*General Machinery Corp. (Niles Tool Wks. Div.), Hamilton, O.
Morton Mfg. Co., Muskegon Heights, Mich.
*Ohio Machine Tool Co., Kenton, O.
*Sellers & Co., Wm., Philadelphia, Pa.

PLASTIC Molding Materials
*Bakelite Corp., New York, N. Y.
Cellulid Corp., 10 E. 40th St., New York City
*Dow Chemical Co., 1000 E. Main St., Midland, Mich.
du Pont de Nemours & Co., E. I., Wilmington, Del.
Durite Plastics, Inc., Philadelphia, Pa.
Fiberloid Div. of Monsanto Chemical Co., Indian Orchard, Mass.
General Electric Co., Bridgeport, Conn.
Masury & Son, John W., Brooklyn, N. Y.
Makalot Corp., Boston, Mass.
Nixon Nitration Works, E. Nixon, N. J.
Reilly Tar & Chemical Corp., Indianapolis, Ind.
Richardson Co., Chicago, Ill.
Tennessee Eastman Corp., Kingsport, Tenn.

PLATES, Angle
*Brown & Sharpe Mfg. Co., Providence, R. I.
Cleveland Universal Jig Co., Cleveland, O.
Knu-Vise Products Co. Inc., Detroit, Mich.
*Pratt & Whitney Div. Niles-Bement-Pond Co., Hartford, Conn.
*Starrett Co., L. S. Athol, Mass.
*Taft-Peirce Mfg. Co., Woonsocket, R. I.
U. S. Automatic Box Machinery Co., Roslindale, Mass.
Van Keuren Co., Watertown, Mass.

PLATES, Surface
*Baumbach Mfg. Co., E. A., Chicago
*Brown & Sharpe Mfg. Co., Providence, R. I.
Challenge Machinery Co., Grand Haven, Mich.
*Delta Mfg. Co., Milwaukee, Wis.
Knu-Vise Products Co., Detroit, Mich.
*Pacific Tool & Supply Co., Los Angeles, Calif.
*Pratt & Whitney Div. Niles-Bement-Pond Co., Hartford, Conn.
*Starrett Co., L. S., Athol, Mass.
U. S. Tool Co., Inc., Ampere, N. J.

PLATFORMS, SKID (see TRUCKS, Hand Lift)

PLATING, Contract
Advance Specialty Co., Philadelphia, Pa.
American Nickeloid Co., Peru, Ill.
Apollo Metal Works Co., Chicago
Chromium Corp. of America, N. Y. C.
Industrial Plating & Finishing Corp., Brooklyn, N. Y.
United Chromium Inc., N. Y. C.
United Platers, Inc., Detroit, Mich.

PLATING, Equipment & Supplies
Alrose Chemical Co., Providence, R. I.
Belke Mfg. Co., Chicago
Crown Rheostat & Supply Co., Chicago
du Pont de Nemours & Co., E. I., Wilmington, Del.
Handy & Harmon, N. Y. C.
Hanson, Van Winkle & Munning Co., Matawan, N. J.
Heil & Co., Cleveland, O.
Lasalco, Inc., St. Louis, Mo.
Lea Mfg. Co., Waterbury, Conn.
Meaker Co., Chicago
Munning & Munning, Inc., Newark, N. J.

HARDENED AND GROUND DOWEL PINS

WE maintain an unusually large stock of Dowel Pins including many diameters and lengths not ordinarily carried in stock. Our pins are .0002" over, .001" over and .002" oversize.

COMPRESSION SPRINGS, for

use in tools, dies, jigs and fixtures, designed to meet the requirements of all tool, die and stamping shops. Prompt and dependable service. Ask for catalog.

DIE SUPPLY COMPANY
1390 E. 30th St. Cleveland, Ohio

DANLY

Precision
DOWEL PINS

DANLY MACHINE SPECIALTIES, INC. 2122 S. 52nd Ave., Chicago, Ill. · Milwaukee, Wis., 513 E. Buffalo St. · Long Island City, N. Y., 36-12 34th St. · Dayton, Ohio, 990 E. Monument Ave. · Detroit, Mich., 1549 Temple Ave. · Rochester, N. Y., 16 Commercial St. · Cleveland, Ohio, 1745 Rockwell Ave. · Philadelphia, Pa., 3913 N. Broad St. · Ducommun Metals & Supply Co., Los Angeles, Calif.; San Francisco, Calif.

DANLY SERVICE
Nine Danly Branch Stocks Provide 24-Hour Service for 95% of All Metal Fabricating Plants.

All Die Makers' Supplies
Danly Precision Dowel Pins
Danly Commercial Sets
Danly Special Sets

DANLY PRECISION DIE SETS

NEW DESIGN HEAVY DUTY
LIBERTY PLANERS

Featuring: rail heads offset toward center and side heads offset toward top with all heads and tool slides having power rapid traverse and power feed in all directions; dual push button control with automatically clamping motorized rail clamp and electric feed.

Write for complete details.

LIBERTY PLANER & MFG. CO.
HAMILTON, OHIO

WHERE-TO-BUY DIRECTORY

** Indicates further information to be found in advertising pages.*

PLATING, Equip. & Supplies (Cont.)
Ransohoff Inc., N., Carthage, Cincinnati
Sargent & Co., E. H., Chicago
Stevens, Inc., Frederic B., Detroit
Storts Welding Co., Meriden, Conn.
Udylite Co., Detroit, Mich.
U. S. Galvanizing & Plating Equip. Corp., Brooklyn, N. Y.

POTENTIOMETERS
Biddle Co., James G., Philadelphia
Bristol Co., Waterbury, Conn.
*Brown Instrument Co., Philadelphia, Pa.
General Electric Co., Schenectady, N. Y.
Leeds & Northrup Co., Philadelphia, Pa.
Tagliabue Co., C. J., Brooklyn, N. Y.
Wheelco Instruments Co., Chicago

POTS, Melting
American Manganese Steel Div., Chicago Hgts., Ill.
Calorizing Co., Wilkinsburg, Pittsburgh, Pa.
Driver-Harris Co., Harrison, N. J.
*Farrel-Birmingham Co., Ansonia, Conn.
General Alloys Co., Boston, Mass.
General Electric Co., Schenectady, N. Y.
Strong, Carlisle & Hammond Mach. Co., Cleveland, O.
Struthers Dunn, Inc., Philadelphia, Pa.
Trent Co., Harold E., Philadelphia, Pa.
Vulcan Electric Co., Lynn, Mass.
*Westinghouse Electric & Mfg. Co., E. Pittsburgh, Pa.

PRESSES, Arbor
*American Broach & Machine Co., Ann Arbor, Mich.
Atlas Press Co., Kalamazoo, Mich.
*Barnes Co., W. F. & John, Rockford, Ill.
Birdsboro Steel Fdry. & Mach. Co., Birdsboro, Pa.
Canedy-Otto Mfg. Co., Chicago Hgts, Ill.
Chambersburg Engrg. Co., Chambersburg, Pa.
Champion Blower & Forge Co., Lancaster, Pa.
Elmes Engrg. Wks., Chas. F., Chicago
*Famco Machine Co., Racine, Wis.
Greenerd Arbor Press Co., Nashua, N. H.
Hannifin Mfg. Co., Chicago
Hydraulic Press Mfg. Co., Mt. Gilead, O.
Lake Erie Engrg. Corp., Buffalo, N. Y.
Logansport Machine Inc., Logansport, Ind.
Nicholson & Co., W. H., Wilkes-Barre, Pa.
*Producto Machine Co., Bridgeport, Conn.
Sheldon Machine Co., Chicago, Ill.
Smith, Inc., Winfield H., Springville, Erie County, N. Y.
*Tomkins-Johnson Co., Jackson, Mich.
*Watson-Stillman Co., Roselle, N. J.

PRESSES, Foot
Baird Machine Co., Bridgeport, Conn.
Bliss Co., E. W., Brooklyn, N. Y.
*Etna Machine Co., Toledo, O.
*Famco Machine Co., Racine, Wis.
Ferracute Machine Co., Bridgeton, N. J.
Lake Erie Engrg. Corp., Kenmore, Buffalo, N. Y.
*Niagara Machine & Tool Works, Buffalo, N. Y.
Peck, Stow & Wilcox Co., Southington, Conn.
Perkins Machine Co., Warren, Mass.
Royersford Foundry & Machine Co., Royersford, Pa.
Service Machine Co., Elizabeth, N. J.
Taylor & Fenn Co., Hartford, Conn.
*V. & O. Press Co., Hudson, N. Y.
Walsh Press & Die Co., Chicago
Waterbury Farrel Fdry. & Mach Co., Waterbury, Conn.

PRESSES, Forging
*Ajax Mfg. Co., Euclid P. O., Cleveland
Alliance Mach. Co., Alliance, Ohio
*Baldwin-Southwark Corp., Paschall, Philadelphia, Pa.
*Bethlehem Steel Co., Bethlehem, Pa.
Bliss Co., E. W., Brooklyn, N. Y.
Chambersburg Engrg. Co., Chambersburg, Pa.
*Clearing Machine Co., Chicago
*Cleveland Punch & Shear Works Co., Cleveland, O.
Elmes Engrg. Wks., Chas. F., Chicago
Erie Foundry Co., Erie, Pa.
Farquhar Co., A. B., York, Pa.
Florence Pipe Fdry. & Machine Co., Florence, N. J.
Hannifin Mfg. Co., Chicago
*Hill-Acme Co., Cleveland, O.
Hydraulic Press Mfg. Co., Mt. Gilead, O.
Lake Erie Engrg. Corp., Buffalo, N. Y.
Mesta Machine Co., Pittsburgh
Minster Machine Co., Minster, O.
Morgan Engrg. Co., Alliance, O.
National Machinery Co., Tiffin, O.
*Niagara Machine & Tool Works, Buffalo N. Y.
Verson Allsteel Press Co., Chicago
*Watson-Stillman Co., Roselle, N. J.
Williams, White & Co., Moline, Ill.
Wood Co., R. D., Philadelphia, Pa.
*Zeh & Hahnemann Co., Newark, N. J.

PRESSES, Hydraulic
*American Broach & Machine Co., Ann Arbor, Mich.
Atlas Press Co., Kalamazoo, Mich.
*Baldwin-Southwark Div. Baldwin Locomotive Wks., Philadelphia, Pa.
*Bethlehem Steel Co., Bethlehem, Pa.
Birdsboro Steel Fdry. & Mach. Co., Birdsboro, Pa.
Bliss, E. W., Brooklyn, N. Y.
Buckeye Iron & Brass Works, Dayton, O.
Chambersburg Engrg. Co., Chambersburg, Pa.
*Clearing Machine Corp., Chicago
Colonial Broach Co., Detroit, Mich.
*Davis Keyseater Co., Rochester, N. Y.
Defiance Machine Works, Defiance, O.
Denison Engrg. Co., Columbus, O.
Dunning & Boschert Press Co., Inc., Syracuse, N. Y.
Elmes Engrg. Wks., Chas. F., Chicago
Erie Foundry Co., Erie, Pa.
Farquhar Co., A. B., York, Pa.
*Farrel-Birmingham Co., Ansonia, Conn.
French Oil Mill Machry. Co., Piqua, O.
*General Machinery Corp. (Niles Tool Wks. Div.), Hamilton, O.
Greenerd Arbor Press Co., Nashua, N. H.
Hanna Engrg. Works, Chicago
Hannifin Mfg. Co., Chicago
Hydraulic Press Mfg. Co., Mt. Gilead, O.
Lake Erie Engrg. Corp., Kenmore, Buffalo, N. Y.
*Lapointe Machine Tool Co., Hudson, Mass.
*Le Maire Tool & Mfg. Co., Dearborn, Mich.
Logansport Machine Inc., Logansport, Ind.
Marburg Brothers, Inc., N. Y. C.
Mesta Machine Co., Pittsburgh, Pa.
Morgan Engrg. Co., Alliance, O.
National Erie Corp., Erie, Pa.
Northern Engrg. Works, Toledo, O.
*Oilgear Co., Milwaukee, Wis.
Seamless Steel Equipment Corp., N. Y. C.
*Tomkins-Johnson Co., Jackson, Mich.
Verson Allsteel Press Co., Chicago
Vulcan Iron Works, Chicago
Waterbury Farrel Fdry. & Mach Co., Waterbury, Conn.
*Watson-Stillman Co., Roselle, N. J.
Williams, White & Co., Moline, Ill.
Wood Co., R. D., Philadelphia, Pa.
*Wright Mfg. Div. Amer. Chain Co. Inc., Bridgeport, Conn.

PRESSES, Power (Punch)
Allsteel Press Co., Chicago, Ill.
Automatic Machine Co., Bridgeport, Conn.
Automatic Mfg. Co., Harrison, N. J.
Baird Machine Co., Bridgeport, Conn.
Beatty Machine & Mfg. Co., Hammond, Ind.
Bliss Co., E. W., Brooklyn, N. Y.
*Buffalo Forge Co., Buffalo, N. Y.
Chambersburg Engrg. Co., Chambersburg, Pa.
*Cincinnati Shaper Co., Cincinnati, O.
*Clearing Mach. Co., Chicago
*Cleveland Punch & Shear Works Co., Cleveland, O.
*Consolidated Machine Tool Corp., Rochester, N. Y.
Contract Engineering Corp., Cleveland, O.
*Davis Keyseater Co., Rochester, N. Y.
Dreis & Krump Mfg. Co., Chicago
Erie Foundry Co., Erie, Pa.
Federal Press Co., Elkhart, Ind.
Ferracute Machine Co., Bridgeton, N. J.
Fox Machine Co., Jackson, Mich.
General Mfg. Co., Detroit, Mich.
*Hendey Machine Co., Torrington, Conn.
Henderson Machine Co., Philadelphia, Pa.
*Henry & Wright Mfg. Co., Hartford, Conn.
Hydraulic Press Mfg. Co., Mt. Gilead, O.
Kent-Owens Machine Co., Toledo, O.
Long & Allstatter Div. of Columbia Machine Tool Co., Hamilton, O.
Marshalltown Mfg. Co., Marshalltown, Ia.
Mesta Machine Co., Pittsburgh, Pa.
*Mitts & Merrill, Saginaw, Mich.
Minster Machine Co., Minster, O.
*Niagara Machine & Tool Works, Buffalo, N. Y.
*Oilgear Co., Milwaukee, Wis.
Peck, Stow & Wilcox Co., Southington, Conn.
Pels & Co., Henry, N. Y. C.
Perkins Machine Co., Warren Mass.
Quickwork-Whiting Corp., Harvey, Ill.
Rockford Iron Works, Rockford, Ill.
*Ryerson & Son, Inc., Jos. T., Chicago
*Schatz Mfg. Co., Poughkeepsie, N. Y.
Standard Machy Co., Providence, R. I.
Super-Speed Press Corp., N. Y. C.
Taylor & Fenn Co., Hartford, Conn.
Thomas Machine Mfg. Co., Pittsburgh
Toledo Mach. & Tool Co., Toledo, O.
United Engrg. & Foundry Co., Pittsburgh, Pa.
*V. & O. Press, Hudson, N. Y.
Verson Allsteel Press Co., Chicago
Waterbury Farrel Fdry. & Mach Co., Waterbury, Conn.
*Wiedemann Machine Co., Philadelphia, Pa.
Whitney Metal Tool Co., Rockford, Ill.
Williams, White & Co., Moline, Ill.
*Zeh & Hahnemann Co., Newark, N. J.

PRESSES, Turret Punch
Excelsior Tool & Machine Co., E. St. Louis, Ill.
Federal Press Co., Elkhart, Ind.
Perkins Machine Co., Warren, Mass.
*Wiedemann Machine Co., Philadelphia

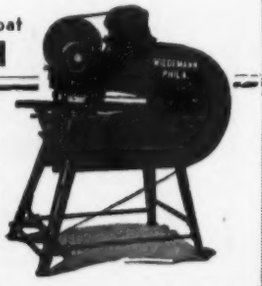
PRESSES, Screw
Aerotool Works, Toronto, Canada
Bliss Co., E. W., Brooklyn, N. Y.
Dunning & Boschert Press Co., Inc., Syracuse, N. Y.
Ferracute Machine Co., Bridgeton, N. J.
Minster Machine Co., Minster, O.
*Niagara Machine & Tool Co., Buffalo, N. Y.
Perkins Machine Co., Warren, Mass.
*Producto Machine Co., Bridgeport, Conn.
*Schatz Mfg. Co., Poughkeepsie, N. Y.
Standard Machinery Co., Providence, R. I.
Waterbury Farrel Fdry. & Mach. Co., Waterbury, Conn.
*Zeh & Hahnemann Co., Newark, N. J.

PRESSES, Straightening
Atlas Press Co., Kalamazoo, Mich.
*Baldwin-Southwark Corp., Paschall, Philadelphia, Pa.
Birdsboro Steel Fdry. & Mach. Co., Birdsboro, Pa.
Chambersburg Engrg. Co., Chambersburg, Pa.
*Cleveland Punch & Shear Works Co., Cleveland, O.
*Consolidated Machine Tool Corp., Rochester, N. Y. (Hilles & Jones Div.)
Elmes Engrg. Wks., Chas F., Chicago
Farquahar Co., A. B., Ltd., York, Pa.
General Mfg. Co., Detroit, Mich.
Greenerd Arbor Press Co., Nashua, N. H.
Hannifin Mfg. Co., Chicago
Hydraulic Press Mfg. Co., Mt. Gilead, O.
Lake Erie Engrg. Corp., Kenmore, Buffalo, N. Y.
Mesta Machine Co., Pittsburgh, Pa.
Morse Twist Drill & Mach. Co., New Bedford, Mass.
*Oilgear Co., Milwaukee, Wis.
Rockford Iron Works, Rockford, Ill.
*Springfield Machine Tool Co., Springfield, O.
United Engrg. & Foundry Co., Pittsburgh
*Watson-Stillman Co., Roselle, N. J.
Western Tool & Mfg. Co., Springfield, O.
Williams, White & Co., Moline, Ill.
Wood Co., R. D., Philadephia, Pa.

PROJECTORS, Contour
Bausch & Lomb Optical Co., Rochester, N. Y.
*Jones & Lamson Machine Co., Springfield, Vt.
Scherr Co., Geo., N. Y. C.
Zeiss, Carl, N. Y. C.

PROTRACTORS, Optical
Bausch & Lomb Optical Co., Rochester, N. Y.

THE TYPE R-4P
a powerful motor driven deep throat
TURRET PUNCH



This machine offers three standard throat depths—18", 24" and 28". It is furnished with 12 punches and dies up to 1¼" dia., mounted in a revolving turret, and is designed for rapid, continuous duty—is safe, convenient, fast and powerful. Punches can be easily and safely brought down to center punched layout by handwheel on even the thinnest sheets.
Write for detailed specifications.

WIEDEMANN MACHINE COMPANY
1815-31 SEDGLEY AVE.
PHILADELPHIA, PENN.

FAMCO
ARBOR PRESSES
FOOT PRESSES

Scientifically designed, accurately machined from selected materials.
40 STOCK SIZES and MODELS (bench and floor types).
Prompt Shipment.
Write for prices and literature

FAMCO MACHINE COMPANY
1316 18th St. Racine, Wis.

WHERE-TO-BUY DIRECTORY

Scherr Co., Geo., N. Y. C.
Zeiss, Carl, N. Y. C.

PULLERS, Gear & Wheel
Armstrong-Bray & Co., Chicago
Edelblute Mfg. Co., Reynoldsville, Pa.
General Electric Co., Schenectady, N. Y.
Martindale Electric Co., Cleveland, O.
*Owatonna Tool Co., Owatonna, Minn.
Springfield Wheel Puller Co., Springfield, O.

PULLEY COVERING, Non-Slip
Nonslip Pulley Covering Co., Buffalo, N. Y.

PULLEYS, Iron, Steel & Wood
American Pulley Co., Philadelphia, Pa.
Boston Gear Works, Inc., N. Quincy, Mass.
*Brown & Sharpe Mfg. Co., Providence, R. I.
Diamond Chain & Mfg. Co., Indianapolis, Ind.
Dodge Mfg. Corp., Mishawaka, Ind.
*Johnson Machine Co., Carlyle, Manchester, Conn.
Link-Belt Co., Chicago
Medart Co., St. Louis, Mo.
Reeves Pulley Co., Columbus, Ind.
Rockwood Mfg. Co., Indianapolis, Ind.
Royerford Fdry. & Mach. Co., Royersford, Pa.

PULLEYS, V-Belt (see Sheaves, V-Belt)

PULLEYS, Vacuum Cup, C. I.
Vacuum Cup Metal Pulley Co., Inc., Detroit, Mich.

PUMPS, Hydraulic
*Allis-Chalmers Mfg. Co., Milwaukee, Wis.
*Baldwin-Southwark Corp., Paschall, Philadelphia, Pa.
*Barnes Co., W. F. & John, Rockford, Ill.
Birdsboro Steel Fdry. & Mach. Co., Birdsboro, Pa.
Chambersburg Engrg. Co., Chambersburg, Pa.
DeLaval Steam Turbine Co., Trenton, N. J.
Dunning & Boschert Press Co., Inc., Syracuse, N. Y.
Elmes Engrg. Wks., Chas. F., Chicago
*Fairbanks, Morse & Co., Chicago
Goulds Pumps, Inc., Seneca Falls, N. Y.
Hydraulic Press Mfg. Co., Mt. Gilead, O.
Ingersoll-Rand Co., N. Y. C.
Lake Erie Engrg. Corp., Kenmore, Buffalo, N. Y.
*Lapointe Machine Tool Co., Hudson, Mass.
*Oilgear Co., Milwaukee, Wis.
*Racine Tool & Machine Co., Racine, Wis.
Rotary Lift Co., Memphis, Tenn.
*Sundstrand Machine Tool Co., Rockford, Ill.
*Vickers Inc., Detroit, Mich.
*Watson-Stillman Co., Roselle, N. J.
Wood Co., R. D., Philadelphia, Pa.
Worthington Pump & Machy. Corp., Harrison, N. J.

PUMPS, Centrifugal
*Allis-Chalmers Mfg. Co., Milwaukee, Wis.
*Brown & Sharpe Mfg. Co., Providence, R. I.
DeLaval Steam Turbine Co., Trenton, N. J.
*Fairbanks, Morse & Co., Chicago
Fulflo Specialties Co., Inc., Blanchester, Ohio
Goulds Pumps, Inc., Seneca Falls, N. Y.
Ingersoll-Rand Co., N. Y. C.
Pioneer Engrg. & Mfg. Co., Detroit
*Ruthman Machry. Co., Cincinnati, O.
*Tomkins-Johnson Co., Jackson, Mich.
Worthington Pump & Machy. Corp., Harrison, N. J.

PUMPS, Lubricant and Coolant
Bijur Lubricating Corp., L. I. City, N. Y.
*Brown & Sharpe Mfg. Co., Providence, R. I.
*Buffalo Forge Co., Buffalo, N. Y.
DeLaval Steam Turbine Co., Trenton, N. J.
Eddington Metal Spec. Co., Eddington, Pa.
*Fairbanks, Morse & Co., Chicago
Fulflo Specialties Co., Blanchester, O.
Goulds Pumps, Inc., Seneca Falls, N. Y.
Ingersoll-Rand Co., N. Y. C.
Pioneer Engrg. & Mfg. Co., Detroit
*Rivett Lathe & Grinder, Inc., Brighton, Boston, Mass.
*Ruthman Machinery Co., Cincinnati, O.
*Sundstrand Machine Tool Co., Rockford, Ill.
*Tomkins-Johnson Co., Jackson, Mich.
*Vickers, Inc., Detroit, Mich.

PUNCHES, Center & Hand (See TOOLS, Hand)

PURIFIERS, Oil & Coolant
Cuno Engrg. Co., Meriden, Conn.
Detroit Lubricator Co., Detroit, Mich.
Fauver Co., J. N., Detroit, Mich.
Felters Co., Inc., Boston, Mass.
Fostoria Pressed Steel Corp., Fostoria, O.
Motor Improvements, Inc., Newark, N. J.
North American Mfg. Co., Cleveland, O.
Skinner Devices, Inc., Detroit, Mich.

PYROMETERS, Indicating & Recording
Bristol Co., Waterbury, Conn.
*Brown Instrument Co., Philadelphia, Pa.
Foxboro Co., Foxboro, Mass.
Gordon Co., Claud S., Chicago
Hoskins Mfg. Co., Detroit, Mich.
Illinois Testing Lab. Inc., Chicago
Leeds & Northrup Co., Philadelphia, Pa.
Pyrometer Instrument Co., N. Y. C.
Tagliabue Mfg. Co., C. J., Brooklyn, N. Y.
Taylor Instrument Co., Rochester, N. Y.
Thwing-Albert Instrument Co., Philadelphia
Wheelco Instruments Co., Chicago

QUENCHERS
*American Gas Furnace Co., Elizabeth, N. J.
*Electric Furnace Co., Salem, O.
*Farrel-Birmingham Co., Buffalo, N. Y.
*Gleason Works, Rochester, N. Y.
Urschel Engrg. Co., Bowling Green, O.

RACKS, Steel
All-Steel-Equip Co., Aurora, Ill.
*Armstrong Bros. Tool Co., Chicago
*Barrett-Cravens Co., Chicago
Cincinnati Clamp Co., Cincinnati, O.
Cincinnati Tool Co., Cincinnati, O.
Lewis-Shepard Sales Corp., Watertown, Mass.
Lyon Metal Products, Aurora, Ill.
Stackbin Corp., Providence, R. I.

RACKS, Gear (see GEARS, Cut)

RASPS (see FILES & RASPS)

RATCHETS (see GEARS, Cut)

REAMERS, Adjustable
*Barber-Colman Co., Rockford, Ill.
*Carboloy Co., Detroit, Mich.
*Cleveland Twist Drill Co., Cleveland, O.
Colonial Broach Co., Detroit, Mich.
Davis Boring Tool Co. (Div. Larkin Packer Co.), St. Louis, Mo.
*Evans Flexible Reamer Co., Chicago, Ill.
Fansteel Metallurgical Corp., N. Chicago, Ill.
*Foster Machine Co., Elkhart, Ind.
Gairing Tool Co., Detroit, Mich.
*Gisholt Machine Co., Madison, Wis.
Greenfield Tap & Die Corp., Greenfield, Mass.
Hannifin Mfg. Co., Chicago
Ingersoll Milling Machine Co., Rockford, Ill.
Kelly Reamer Co., Cleveland, O.
McCrosky Tool Corp., Meadville, Pa.
*Michigan Tool Co., Detroit, Mich.
Morse Twist Drill & Mach. Co., New Bedford, Mass.
National Tool Co., Cleveland, O.
*Pratt & Whitney Div. Niles-Bement-Pond Co., Hartford, Conn.
Putnam Tool Co., Detroit, Mich.
*Scully-Jones & Co., Chicago
Standard Tool Co., Cleveland, O.
Super Tool Company, Detroit, Mich.
*Taft-Peirce Mfg. Co., Woonsocket, R. I.
*Union Twist Drill Co., Athol, Mass.

REAMERS, Pipe
*American Swiss File & Tool Co., Elizabeth, N. J.
*Armstrong Bros. Tool Co., Chicago
Beaver Pipe Tools Inc., Warren, O.
*Butterfield Div. (Union Twist Drill Co.), Derby Line, Vt.
*Card Mfg. Co., E. W., (Div. Union Twist Drill), Mansfield, Mass.
*Cleveland Twist Drill Co., Cleveland, O.
Detroit Tap & Tool Co., Detroit, Mich.
Gairing Tool Co., Detroit, Mich.

ATTENTION!
MACHINE TOOL MANUFACTURERS
Uncle Sam is looking to you to speed up production so that the defense program will proceed as planned. Get your orders for "GUSHER" COOLANT PUMPS in at once. Anticipate your demands and you'll have your pumps when you need them.

THE RUTHMAN MACHINERY CO.
201 PIKE ST., CINCINNATI, OHIO
LARGEST EXCLUSIVE BUILDERS OF COOLANT PUMPS

EVANS HIGH SPEED STEEL REAMERS
• No honing.
• Will not chatter.
• Chrome-like finish.
• Perfect alignment.
• Full bearing surface.
• Left and right spirals.
• 50 to 80 thousandths expansion.
• Cannot fail in slots or oil grooves.
• Extension pilots for line-up work.
LOOK AT THESE FEATURES
Will Ship on 30 Days' Trial
Write for Circular
EVANS FLEXIBLE REAMER CORP.
4543 RAVENSWOOD AVE. • CHICAGO, ILL.

OTC GRIPOMATIC PULLERS
CUT PRODUCTION DELAYS
Conserve time and man power, reduce accidents—with OTC GRIPOMATIC PULLERS. Automatic grip prevents slipping. Capacities 5 to 50 tons.
OTC PULLING SYSTEM
Includes Pushers and Pullers to install or remove gears, bearings, wheels, pulleys, sleeves, shafts, etc. Write for Plant Maintenance Bulletin.
SPECIAL TOOLS designed and made.
OWATONNA TOOL CO.
353 Cedar St. Owatonna, Minn.

WHERE-TO-BUY DIRECTORY

** Indicates further information to be found in advertising pages.*

REAMERS, Pipe (Cont.)
Greenfield Tap & Die Corp., Greenfield, Mass.
Ingersoll-Rand Co., New York, N. Y.
*Michigan Tool Co., Detroit, Mich.
Morse Twist Drill & Mach. Co., New Bedford, Mass.
*National Twist Drill & Tool Co., Detroit, Mich.
*Oster Mfg. Co., Cleveland, O.
Standard Tool Co., Cleveland, O.
*Torrington Co., Torrington, Conn.
Walworth Co., N. Y. C.

REAMERS, Power
Catskill Metal Works, Catskill, N. Y.
Chicago Pneumatic Tool Co., New York, N. Y.
Cleveland Pneumatic Tool Co., Cleveland, Ohio
Independent Pneumatic Tool Co., Chicago, Ill.
Rotor Tool Co., Cleveland, O.

REAMERS, Power
Catskill Metal Works, Catskill, N. Y.

REAMERS, Shell
*Butterfield & Co., Div. Union Twist Drill Co., Derby Line, Vt.
*Cleveland Twist Drill Co., Cleveland, O.
*Gammons-Holman Co., Manchester, Conn.
Goddard & Goddard Co., Detroit, Mich.
Greenfield Tap & Die Corp., Greenfield, Mass.
*Illinois Tool Works, Chicago
Morse Tool Co., Detroit, Mich.
Morse Twist Drill & Machine Co., New Bedford, Mass.
*National Twist Drill & Tool Co., Detroit
*Pratt & Whitney Div. Niles-Bement-Pond Co., Hartford, Conn.
*Union Twist Drill Co., Athol, Mass.
Whitman & Barnes, Detroit, Mich.

REAMERS, Solid
*Barber-Colman Co., Rockford, Ill.
*Butterfield Div. (Union Twist Drill Co.), Derby Line, Vt.
*Carboloy Co., Detroit, Mich.
*Cleveland Twist Drill Co., Cleveland, O.
Colonial Broach Co., Detroit, Mich.
Davis Boring Tool Co. (Div. Larkin Packer Co.), St. Louis, Mo.
Detroit Tap & Tool Co., Detroit, Mich.
*Ex-Cello-O Corp., Detroit, Mich.
Fansteel Metallurgical Corp., N. Chicago, Ill.
Gairing Tool Co., Detroit, Mich.
*Gammons Holman Co., Manchester, Conn.
*Gisholt Machine Co., Madison, Wis.
Gorham Tool Co., Detroit, Mich.
Greenfield Tap & Die Corp., Greenfield, Mass.
Haynes Stellite Co., Kokomo, Ind.
*Holman Reamer Co., Manchester, Conn.
*Illinois Tool Works, Chicago
*Michigan Tool Co., Detroit, Mich.
Morse Twist Drill & Mach. Co., New Bedford, Mass.
National Tool Co., Cleveland, O.
*National Twist Drill & Tool Co., Detroit, Mich.
*Pratt & Whitney Div. Niles-Bement-Pond Co., Hartford, Conn.
*Scully-Jones & Co., Chicago
Standard Tool Co., Cleveland, O.
*Taft-Peirce Mfg. Co., Woonsocket, R. I.
*Union Twist Drill Co., Athol, Mass.
Whitman & Barnes, Detroit, Mich.

REAMING MACHINES
*Barnes Co., W. F. & John, Rockford, Ill.
*Van Norman Machine Tool Co., Springfield, Mass.

RECORDERS, Speed (see **INDICATORS Speed**)

RECORDERS, Temperature & Pressure
Bristol Co., Waterbury, Conn.
*Brown Instrument Co., Philadelphia
Foxboro Co., Foxboro, Mass.
Hoskins Mfg. Co., Detroit, Mich.
Leeds & Northrup Co., Philadelphia
Marsh Corp., Jas. P., Chicago
Partlow Corp., Hartford, N. Y.
Tagliabue Mfg. Co., C. J., Brooklyn, N. Y.
Taylor Instrument Co., Rochester, N. Y.
Thwing-Albert Instrument Co., Philadelphia, Pa.

RECORDERS, Time
Bristol Co., Waterbury, Conn.
Foxboro Co., Foxboro, Mass.
Internatl. Business Mach. Corp., N. Y. C.
Tagliabue Mfg. Co., C. J., Brooklyn, N. Y.

RECTIFIERS, Electric Power
*Allis-Chalmers Mfg. Co., Milwaukee, Wis.
Cassels Engrg. & Mach. Co., Wauwatosa, Wis.
General Electric Co., Schenectady, N. Y.
*Janette Mfg. Co., Chicago, Ill.
Raytheon Mfg. Co., Waltham, Mass.
Ward Leonard Elec. Co., Mt. Vernon, N. Y.
*Westinghouse Elec. & Mfg. Co., E. Pittsburgh, Pa.

REDUCERS, Motorized Speed
*Adams Co., Dubuque, Iowa
*Allis-Chalmers Mfg. Co., Milwaukee, Wis.
*Barber-Colman Co., Rockford, Ill.
Boston Gear Works, Inc., Quincy, Mass.
Cleveland Elec. Motor Co., Cleveland, O.
*Dumore Co., Racine, Wis.
*Earle Gear & Machine Co., Philadelphia
Foote Gear Works, Inc., Cicero, Ill.
*Foote Bros. Gear & Mach. Corp., Chicago
*Ganschow Gear Co., Chicago
*Gear Specialties, Inc., Chicago
General Electric Co., Schenectady, N. Y.
*James Mfg. Co., D. O., Chicago
*Janette Mfg. Co., Chicago
Lima Armature Works, Lima, O.
Link-Belt Co., Philadelphia, Pa.
Mechanical Specialties, Inc., Chicago
*Meisel Press Mfg. Co., Boston, Mass.
*Ohio Gear Co., Cleveland, O.
*Philadelphia Gear Works, Philadelphia
Palmer-Bee Co., Detroit, Mich.
*Reliance Elec. & Engrg. Co., Cleveland
Shepard Niles Crane & Hoist Corp., Montour Falls, N. Y.
Sterling Electric Motors, Inc., Los Angeles, Calif.
U. S. Electrical Motors, Inc., Los Angeles, Calif.
Wagner Electric Corp., St. Louis, Mo.
*Westinghouse Elec. & Mfg. Co., E. Pittsburgh, Pa.

REDUCERS, Speed
Abart Gear & Machine Co., Chicago, Ill.
*Adams Co., Dubuque, Iowa
Bodine Electric Co., Chicago
Bond Co., Chas., Philadelphia, Pa.
Boston Gear Works, Inc., No. Quincy, Mass.
*Cullman Wheel Co., Chicago
*Davis & Thompson Co., Milwaukee, Wis.
DeLaval Steam Turbine Co., Trenton, N. J.
*Earle Gear & Machine Co., Philadelphia
*Farrel-Birmingham Co., Buffalo, N. Y.
Foote Gear Works, Inc., Cicero, Ill.
*Ganschow Gear Co., Chicago
*Gear Specialties, Inc., Chicago
General Electric Co., Schenectady, N. Y.
*General Machinery Corp. (Niles Tool Wks. Div.), Hamilton, O.
*Grant Gear Works, Inc., So. Boston, Mass.
*James Mfg. Co., D. O., Chicago
*Janette Mfg. Co., Chicago
Lee & Son, Inc., K. O., Aberdeen, S. D.
Link Belt Co., Chicago
Morse Chain Co., Ithaca, N. Y.
Ohio Gear Co., Cleveland
*Oilgear Co., Milwaukee, Wis.
*Philadelphia Gear Works, Philadelphia
*Racine Tool & Machine Co., Racine, Wis.
Smith, Inc., Winfield, Springville, N. Y.
Stahl Gear & Machine Co., Cleveland
*Sundstrand Machine Tool Co., Rockford, Ill.
*Vickers, Inc., Detroit, Mich.
*Watson-Stillman Co., Roselle, N. J.
*Westinghouse Elec. & Mfg. Co., E. Pittsburgh, Pa.
Wood Co., R. D., Philadelphia
Worthington Pump & Machy. Corp., Harrison, N. J.

REELS, Strip-Stock
American Pulley Co., Philadelphia, Pa.
Baird Machine Co., Bridgeport, Conn.
*Littell Machine Co., F. J., Chicago
Quickwork-Whiting Corp., Harvey, Ill.
U. S. Tool Co., Ampere, N. J.
Waterbury Farrel Fdry. & Mach. Co., Waterbury, Conn.
Yoder Co., Cleveland, O.

REFRACTORIES
Armstrong Cork Co., Lancaster, Pa.
Babcock & Wilcox Co., N. Y. C.
*Bay State Abrasive Products Co., Westboro, Mass.
Botfield Refractories Co., Philadelphia
Carborundum Co., Niagara Falls, N. Y.
Johns-Manville, N. Y. C.
*Norton Co., Worcester, Mass.
Quigley Co., Inc., N. Y. C.
Strong, Carlisle & Hammond Co., Cleveland

REGULATORS, Oxygen & Acetylene
*Air Reduction Sales Co., N. Y. C.
Linde Air Products Co., N. Y. C.
National Cylinder Gas Co., Chicago

REGULATORS, Speed
Cutler-Hammer, Inc., Milwaukee, Wis.
General Electric Co., Schenectady, N. Y.
Link-Belt Co., Philadelphia, Pa.
*Vickers, Inc., Detroit, Mich.
*Westinghouse Elec. & Mfg. Co., E. Pittsburgh, Pa.

REGULATORS, Temperature
*American Gas Furnace Co., Elizabeth, N. J.
Automatic Temperature Control Co., Pittsburgh
*Barber-Colman Co., Rockford, Ill.
Bristol Company, Waterbury, Conn.
*Brown Instrument Co., Philadelphia, Pa.
Foxboro Co., Foxboro, Mass.
Leeds & Northrup Co., Philadelphia, Pa.
Partlow Corp., Hartford, N. Y.
Tagliabue Mfg. Co., C. J., Brooklyn, N. Y.
Taylor Instrument Co., Rochester, N. Y.
Wheelco Instruments, Chicago

RESPIRATORS
*American Optical Co., Southbridge, Mass.
Chicago Eye Shield Co., Chicago
Cover, H. S., South Bend, Ind.
Davis Emergency Equipt. Co., N. Y. C.
DeVilbiss Co., Toledo, O.
Goodrich Co., B. F., Akron, O.
Industrial Products Co., Philadelphia
Martindale Electric Co., Cleveland
Mine Safety Appliance Co., Pittsburgh

GAMMONS TOOLS

•

Helical Fluted Reamers

And End Mills

•

Special Tools

•

THE GAMMONS HOLMAN CO.

MANCHESTER, CONN.

HOLMAN

Helical Taper Pin Reamer

For finishing holes for taper pins economically

BETTER FASTER

Made from selected steel by the most modern processes. Also Chucking and Rose Reamers. Special Taper Reamers. New Low Price—Circular and price list No. 2 on request.

HOLMAN REAMER CO., Manchester, Conn.

WHERE-TO-BUY DIRECTORY

** Indicates further information to be found in advertising pages.*

Pangborn Corp., Hagerstown, Md.
Wilson Products, Inc., Reading, Pa.

RIVETERS, Electric Power
*Buffalo Forge Co., Buffalo, N. Y.
Chicago Rivet & Machine Co., Chicago
*Grant Mfg. & Machine Co., Bridgeport, Conn.
High Speed Hammer Co., Inc., Rochester, N. Y.
*Linley Bros. Co., Bridgeport, Conn.
Milford Rivet & Machine Co., Milford, Conn.
North Engrg. Co., Chicago
Penn Rivet Corp., Philadelphia, Pa.
*Tomkins-Johnson Co., Jackson, Mich.
Tubular Rivet & Stud Co., Boston, Mass.
Whitney Metal Tool Co., Rockford, Ill.

RIVETERS, Pneumatic & Hydraulic
*Baldwin-Southwark Corp., Paschall, Philadelphia
Birdsboro Steel Fdry. & Mach. Co., Birdsboro, Pa.
Chambersburg Engrg. Co., Chambersburg, Pa.
Chicago Pneumatic Tool Co., N. Y. C.
Cleveland Pneumatic Tool Co., Cleveland
Elmes Engrg. Wks., Chas. F., Chicago
Hanna Engrg. Works, Chicago
Hannifin Mfg. Co., Chicago
Independent Pneumatic Tool Co., Chicago
Ingersoll-Rand Co., N. Y. C.
Lake Erie Engrg. Corp., Buffalo, N. Y.
*Niagara Machine & Tool Works, Buffalo, N. Y.
Quickwork-Whiting Corp., Harvey, Ill.
*Watson-Stillman Co., Roselle, N. J.
Williams, White & Co., Moline, Ill.

RIVETS
*Aluminum Co. of America, Pittsburgh
*American Steel & Wire Co. (U. S. Steel Subsidiary), Pittsburgh
*Bethlehem Steel Co., Bethlehem, Pa.
Blake & Johnson Co., Waterville, Conn.
Bridgeport Brass Co., Bridgeport, Conn.
Bridgeport Screw Co., Bridgeport, Conn.
Champion Rivet Co., Cleveland
Chase Brass & Copper Co., Waterbury, Conn.
Chicago Rivet & Machine Co., Chicago
Conklin Brass & Copper Co., N. Y. C.
General Rivet & Machine Co., Milford, Conn.
*Lamson & Sessions Co., Cleveland, O.
Milford Rivet & Machine Co., Milford, Conn.
Russell, Burdsall & Ward Bolt & Nut Co., Coraopolis, Pa.
Scovill Mfg. Co., Waterbury, Conn.
Tubular Rivet & Stud Co., Boston, Mass.

ROLLS, Bending
*Baldwin-Southwark Co., Paschall, Philadelphia
*Buffalo Forge Co., Buffalo, N. Y.
Champion Blower & Forge Co., Lancaster, Pa.
*Cleveland Punch & Shear Works Co., Cleveland, O.
*Consolidated Machine Tool Corp., Rochester, N. Y.
*General Machinery Corp. (Niles Tool Wks. Div.), Hamilton, O.
Hendley & Whittemore Co., Beloit, Wis.
Kane & Roach, Syracuse, N. Y.
Mesta Machine Co., Pittsburgh, Pa.
*Niagara Machine & Tool Works, Buffalo, N. Y.
Peck, Stow & Wilcox, Southington, Conn.
Quickwork-Whiting Corp., Harvey, Ill.
*Ryerson & Son, Jos. T., Chicago
Thomas Machine Mfg. Co., Pittsburgh
United Engrg. & Fdry. Co., Pittsburgh
Wickes Bros., Saginaw, Mich.

ROLLS, Forging
*Ajax Mfg. Co., Cleveland, O.
*Bethlehem Steel Co., Bethlehem, Pa.
Birdsboro Steel Foundry & Machine Co., Birdsboro, Pa.
Erie Forge Co., Erie, Pa.
Heppenstall Co., Pittsburgh, Pa.
Williams, White & Co., Moline, Ill.

ROPE, Wire
*American Cable Div. of Am. Chain & Cable Co., N. Y. C.
*Bethlehem Steel Co., Bethlehem, Pa.
Hazard Wire Rope Div. Am. Chain & Cable Co., N. Y. C.
Leschen & Sons Rope Co., A., St. Louis, Mo.
National Production Co., Detroit, Mich.
Roebling's Sons Co., John A., Trenton, N. J.
*Ryerson & Son, Jos. T., Chicago
Wickwire-Spencer Steel Co., N. Y. C.

ROUTERS
Challenge Machy. Co., Grand Haven, Mich.
*Consolidated Mach. Tool Corp., Rochester (Hilles & Jones Div.)
*Gorton Machine Co., Geo., Racine, Wis.
*Knight Machy. Co., W. B., St. Louis
Onsrud Machine Works, Chicago
*Reed-Prentice Co., Worcester, Mass.

RUBBER PRODUCTS
American Hard Rubber Co., New York City
Luzerne Rubber Co., Trenton, N. J.
Goodrich Co., B. F., Akron, Ohio
Goodyear Tire & Rubber Co., Akron, O.
Richardson Co., Indianapolis, Ind.
Stokes Rubber Co., Jos., Trenton, N. J.
Tech-Art Plastics Co., Long Island City, N. Y.
Universal Moulding Co., San Francisco, Calif.
Vulcanized Rubber Co., New York City
Waterbury Button & Mfg. Co., Waterbury, Conn.
Western Rubber Co., Goshen, Ind.

RULES, Machinists'
*Brown & Sharpe Mfg. Co., Providence, R. I.
*Lufkin Rule Co., Saginaw, Mich.
Stanley Tools, New Britain, Conn.
*Starrett Co., L. S., Athol, Mass.

RUSTPROOFING & SLUSHING COMPOUNDS
Alex Corp., Niagara Falls, N. Y.
American Chemical Paint Co., Ambler, Pa.
American Coppercote, Inc., N. Y. C.
*Bakelite Corp., N. Y. C.
Collard, Inc., Detroit, Mich.
Estox Products Co., New Haven, Conn.
Fales Chem. Co., Inc., N. Y. C.
Goodrich Company, B. F., Akron, O.
Gulf Oil Corp., Pittsburgh, Pa.
Holden Co., A. F., New Haven, Conn.
Houghton & Co., E. F., Philadelphia, Pa.
Keystone Lubricating Co., Philadelphia
Michigan Chrome Co., Detroit, Mich.
Never Rust Mfg. Co., Brooklyn, N. Y.
*Oakite Products Co., N. Y. C.
Parker Rust-Proof Co., Detroit, Mich.
Quigley Co. Inc., N. Y. C.
*Socony-Vacuum Oil Co., Inc., N. Y. C.
*Standard Oil Co. of Indiana, Chicago
Tidewater Oil Co., N. Y. C.
Udylite Co., Detroit
Wayne Chemical Products, Div. Wayne Soap Co., Detroit, Mich.

SALVAGING, Tool
Chartier Tool Holder Co., Chicago, Ill.
Chicago Tool Reclaiming Co., Chicago, Ill.
National Tool Salvage Co., Detroit, Mich.

SAND & SHOT BLAST MACHINES
American Fdry. Equipt. Co., Milwaukee
Koven & Bro., L. O., Jersey City, N. J.
Pangborn Corp., Hagerstown, Md.
Sly Mfg. Co., W. W., Cleveland, O.

SANDERS, Machine & Portable
American Saw Mill Machinery Co., Hackettstown, N. J.
*Black & Decker Mfg. Co., Towson, Md.
Buckeye Portable Tool Co., Dayton, O.
Carborundum Co., Niagara Falls, N. Y.
Champion Blower & Forge Co., Lancaster, Pa.
Chicago Pneumatic Tools Co., N. Y. C.
Clark, Jr., Electric Co., Jas., Louisville, Ky.
*Delta Mfg. Co., Milwaukee, Wis.
Detroit Surfacing Machine Co., Detroit
*Haskins Co., R. G., Chicago
Independent Pneumatic Tool Co., Chicago
Ingersoll-Rand Co., N. Y. C.
*Jefferson Machine Tool Co., Cincinnati, O.
Mall Tool Co., Chicago
*Mattison Machine Works, Rockford, Ill.
Milwaukee Electric Tool Corp., Milwaukee, Wis.
Porter-Cable Machine Co., Syracuse, N. Y.
Production Machine Co., Greenfield, Mass.
Rotor Air Tool Co., Cleveland, O.
Skilsaw, Inc., Chicago
Stanley Electric Tool Div., Stanley Works, New Britain, Conn.
Sterling Products Co., Detroit, Mich.
Stow Mfg. Co., Binghamton, N. Y.
Strand Co., N. A., Chicago
Syracuse Guide Tool Co., Syracuse, N. Y.
U. S. Electrical Tool Co., Cincinnati
Van Dorn Elec. Tool Co., Towson, Md.
*Walker-Turner Co., Plainfield, N. J.
Walls Sales Corp., N. Y. C.

SAW BLADES, Circular Metal-Cutting
*Atkins & Co., E. C., Indianapolis, Ind.
*Barber-Colman Co., Rockford, Ill.
*Brown & Sharpe Mfg. Co., Providence, R. I.
*Butterfield Div. (Union Twist Drill Co.), Derby Line, Vt.
*Carboloy Co., Detroit, Mich.
Circular Tool Co., Providence, R. I.
*Disston & Sons, Inc., Henry, Tacony, Philadelphia
Gorham Tool Co., Detroit, Mich.
Heller Machine Co., N. Y. C.
*Illinois Tool Works, Chicago
Ingersoll Milling Machine Co., Rockford, Ill.
*Michigan Tool Co., Detroit, Mich.
Morse Twist Drill & Mach. Co., New Bedford, Mass.
*National Twist Drill & Tool Co., Detroit
*Pratt & Whitney Div. Niles-Bement-Pond Co., Hartford, Conn.
Standard Tool Co., Cleveland, O.
Wesson Co., Detroit, Mich.

SAW BLADES, Hack & Band (See BLADES, Hack & Band-Saw)

SAWS, Band, Metal-Cutting (Machines)
*Armstrong-Blum Mfg. Co., Chicago
*Atkins & Co., E. C., Indianapolis, Ind.
*Avey Drilling Machine Co., Inc., Cincinnati
Barnes Co., Inc., W. O., Detroit, Mich.
Black Diamond Saw & Mach. Wks., Natick, Mass.
Cochrane-Bly Co., Rochester, N. Y.
*Capewell Mfg. Co., Hartford, Conn.
*Continental Machines, Inc., Minneapolis, Minn.
*Delta Mfg. Co., Milwaukee, Wis.
Forsberg Mfg. Co., Bridgeport, Conn.
Grob Brothers, Grafton, Wis.
Laidlaw Inc., Wm., Belmont, N. Y.
Marburg Bros. Inc., N. Y. C.
Millers Falls Co., Greenfield, Mass.
Oliver Machinery Co., Grand Rapids, Mich.
*Racine Tool & Machine Co., Racine, Wis.
*Reed-Prentice Corp., Worcester, Mass.
*Ryerson & Son, Jos. T., Chicago
*Walker-Turner Co., Plainfield, N. J.
Wells Mfg. Co., Three Rivers, Mich.

SAWS, Circular, Metal-Cutting (Machines)
Cochrane-Bly Co., Rochester, N. Y.
*Consolidated Mach. Tool Corp., Rochester, N. Y. (Newton Div.)
*Disston & Sons, Inc., Henry, Tacony, Philadelphia
*Earle Gear & Machine Co., Philadelphia
Heller Machine Co., N. Y. C.
Huther Bros. Saw & Mfg. Co., Rochester, N. Y.
Kane & Roach, Inc., Syracuse, N. Y.
*Porter-McLeod Machine Tool Co., Hatfield, Mass.

SAWS, Circular, Wood-Cutting (Machine)
American Saw Mill Machinery Co., Hackettstown, N. J.
*Atkins & Co., E. C., Indianapolis, Ind.
Curtis Pneumatic Machy. Co., St. Louis
*Delta Mfg. Co., Milwaukee, Wis.
DeWalt Products Corp., Lancaster, Pa.
*Disston & Sons, Inc., Henry, Tacony, Philadelphia
*Mattison Machine Works, Rockford, Ill.
*Michigan Tool Co., Detroit, Mich.
Oliver Machinery Co., Grand Rapids, Mich.
*Walker-Turner Co., Inc., Plainfield, N. J.

SAWS, Friction
Bethlehem Fdry. & Mach. Co., Bethlehem, Pa.
*Ryerson & Son, Inc., Jos. T., Chicago
United Engrg. & Fdry. Co., Pittsburgh

SAWS, Hack (See TOOLS, Hand)

SAWS, Hole
*Armstrong-Blum Co., Chicago
*Atkins & Co., E. C., Indianapolis, Ind.
*Black & Decker Mfg. Co., Towson, Md.
D. & D. Tool Co., Seattle, Wash.
Millers Falls Co., Greenfield, Mass.
Misener Mfg. Co., Syracuse, N. Y.
R & L Tool Co., Philadelphia, Pa.
Skilsaw, Inc., Chicago
Stanley Electric Tool Div., Stanley Works, New Britain, Conn.
Van Dorn Electric Tool Co., Towson, Md.

SAWS, Portable (See TOOLS, Portable)

SAWS, Power Hack
*Armstrong-Blum Mfg. Co., Chicago, Ill.
*Atkins & Co., E. C., Indianapolis, Ind.
Champion Blower & Forge Co., Lancaster, Pa.
Cochrane-Bly Co., Rochester, N. Y.
Covel Mfg. Co., Benton Harbor, Mich.
Heller Machine Co., N. Y. C.
*L. W. Chuck Co., Toledo, Ohio
Marburg Brothers, Inc., N. Y. C.
*Oster Mfg. Co., Cleveland, O.
*Peerless Machine Co., Racine, Wis.
*Racine Tool & Mach. Co., Racine, Wis.
Rasmussen Machine Co., Racine, Wis.
*Ryerson & Son, Inc., Jos. T., Chicago
Wells Mfg. Corp., Three Rivers, Mich.

SCALES, Weighing & Counting
*Brown & Sharpe Mfg. Co., Providence, R. I.
Exact Weight Scale Co., Columbus, O.
*Fairbanks, Morse & Co., Chicago
Howe Scale Co., Rutland, Vt.
Standard Computing Scale Co., Detroit
Toledo Scale Co., Toledo, O.

SCRAPERS, Belt
*Atkins & Co., E. C., Indianapolis, Ind.
*Disston & Sons, Inc., Henry, Tacony, Philadelphia
Graton & Knight Co., Worcester, Mass.
Link-Belt Co., Chicago
Rhoads & Sons, J. E., Philadelphia, Pa.
Stephens-Adamson Mfg. Co., Aurora, Ill.

SCRAPERS, Hand (See TOOLS, Hand)

SCRAPERS, Power
Anderson Brothers Mfg. Co., Rockford, Ill.
*Black & Decker Mfg. Co., Towson, Md.

SCREWDRIVERS, Flexible-Shaft (See TOOLS, Flexible-Shaft)

SCREWDRIVERS, Hand (See TOOLS, Hand)

SCREWDRIVERS, Portable Electric & Pneumatic (See TOOLS, Portable)

FASTER PRODUCTION and BETTER WORK ON LINLEY NOISELESS RIVETERS

Sturdy, fast, easily operated! Put your production rivet spinning jobs on LINLEY NOISELESS RIVETING MACHINES and watch your costs come down.

Ask us to demonstrate the quality of work that can be turned out on these modern, NOISELESS machines. Send us samples of your parts and you'll be impressed both with *what* you can do and *how little* it will cost you to do it. Sizes and types available for iron or cold rolled steel rivets up to ⅝" with capacity for larger rivets of softer materials. Write for Descriptive Bulletin R.

LINLEY BROTHERS CO.
12 Montauk St. Bridgeport, Conn.

★ WHERE-TO-BUY DIRECTORY ★

** Indicates further information to be found in advertising pages.*

SCREWDRIVING & NUT-SETTING MACHINES
Akron Automatic Machine Co., Cleveland
Bodine Corp., Bridgeport, Conn.
*Detroit Power Screwdriver Co., Detroit
*Haskins Co., R. G., Chicago
Millers Falls Co., Greenfield, Mass.
Procunier Safety Chuck Co., Chicago
*Producto Machine Co., Bridgeport, Conn.
Schauer Machine Co., Cincinnati
Strand & Co., N. A., Chicago

SCREW-MACHINES, Automatic
*Brown & Sharpe Mfg. Co., Providence, R. I.
*Cleveland Automatic Machine Co., Cleveland
*Cone Automatic Machine Co., Windsor, Vt.
Cosa Oversea Trading Corp., N. Y. C.
Davenport Machine Tool Co., Rochester, N. Y.
Foote-Burt Co., Cleveland
*Foster Machine Co., Elkhart, Ind.
Greenlee Bros. & Co., Rockford, Ill.
*National Acme Co., Cleveland
*New Britain-Gridley Machine Div., New Britain Machine Co., New Britain, Conn.
Scherr Co., Inc., George, N. Y. C.
Windsor Automatic Co., Inc., Windsor, Vt.

SCREW-MACHINES, Plain & Hand
Acme Machine Tool Co., Cincinnati
*Brown & Sharpe Mfg. Co., Providence, R. I.
Brown Machine Co., Chicago, Ill.
*Cleveland Automatic Machine Co., Cleveland
*Foster Machine Co., Elkhart, Ind.
*Gisholt Machine Co., Madison, Wis.
*Hardinge Brothers, Inc., Elmira, N. Y.
*Jones & Lamson Machine Co., Springfield, Vt.
*Milliholland Sales & Mach. Co., Indianapolis, Ind.
Modern Collet & Machine Co., Ecorse Detroit, Mich.
*National Acme Co., Cleveland
*Rivett Lathe & Grinder Inc., Brighton, Boston, Mass.
Stark Tool Co., Waltham, Mass.
*Warner & Swasey Co., Cleveland

SCREW PLATES (See DIES, Screw-Cutting, Adjustable)

SCREWS, Cap and Set
*Allen Mfg. Co., Hartford, Conn.
*Baumbach Mfg. Co., E. A., Chicago
Bristol Company, Waterbury, Conn.
Clark Bros. Bolt Co., Millidale, Conn.
*Danly Machine Specialties Inc., Chicago
Dardelet Threadlock Corp., N. Y. C.
Holo-Krome Screw Corp., Hartford, Conn.
*Lamson & Sessions Co., Cleveland
*National Acme Co., Cleveland
Parker-Kalon Corp., N. Y. C.
Republic Steel Corp., Cleveland, O.
Russell Burdsall & Ward Bolt & Nut Co., Port Chester, N. Y.
Scovill Mfg. Co., Waterbury, Conn.
*Shakeproof Lock Washer Co., Chicago
*Standard Pressed Steel Co., Jenkintown, Pa.
Strong, Carlisle & Hammond Co., Cleveland, O.

SCREWS, Machine
*Allen Mfg. Co., Hartford, Conn.
Bristol Company, Waterbury, Conn.
Chase Brass & Copper Co., Waterbury, Conn.
Dardelet Threadlock Corp., N. Y. C.
Harper Co., H. M., Chicago
Holo-Krome Screw Corp., Hartford, Conn.
Lamson & Sessions Co., Cleveland, O.
Nielsen Tool & Die Co., Berkeley, Mich.
Ohio Nut & Bolt Co., Berea, O.
Progressive Mfg. Co., Torrington, Conn.
R & L Tools, Nicetown, Philadelphia
Republic Steel Co., Cleveland, O.
Russell, Burdsall & Ward Bolt & Nut Co., Port Chester, N. Y.
Scovill Mfg. Co., Waterbury, Conn.
Strong, Carlisle & Hammond Co., Cleveland, O.

SCREWS, Recessed-Head
American Screw Co., Providence, R. I.
Chandler Products Co., Cleveland, Ohio
Continental Screw Co., New Bedford, Mass.
Corbin Screw Corp., New Britain, Conn.
*Lamson & Sessions Co., Cleveland, Ohio
National Screw & Mfg. Co., Cleveland, O.
Parker-Kalon Corp., New York, N. Y.
Pheoll Mfg. Co., Chicago, Ill.
Russell, Burdsall & Ward Bolt & Nut Co., Port Chester, N. Y.
Scovill Mfg. Co., Waterbury, Conn.
*Shakeproof Lock Washer Co., Chicago
*Standard Pressed Steel Co., Jenkintown, Pa.

SCREWS, Self-Tapping
Corbin Screw Corp., New Britain, Conn.
Parker-Kalon Corp., N. Y. C.
Pheoll Mfg. Co., Chicago
Shakeproof Lock Washer Co., Chicago

SCREWS, Thumb & Wing
American Screw Co., Providence, R. I.
Billings & Spencer Co., Hartford, Conn.
California Screw Co., San Francisco
Corbin Screw Corp., New Britain, Conn.
Harper, H. M., Co., Chicago
Haskell, Wm. H. Mfg. Co., Pawtucket, R. I.
National Screw & Mfg. Co., Cleveland
Parker-Kalon Corp., N. Y. C.
Pheoll Mfg. Co., Chicago
United Screw & Bolt Corp., Cleveland
*Williams & Co., J. H., N. Y. C.

SCREWS, Transfer
Nielsen Tool & Die Co., Berkly, Mich.

SCRIBERS
Bartusch, A. P., Lockport, N. Y.
*Brown & Sharpe Mfg. Co., Providence, R. I.
Ford Motor Co., Johannsson Div., Dearborn, Mich.
*Lufkin Rule Co., Saginaw, Mich.
Millers Falls Co., Greenfield, Mass.
*Starrett Co., L. S., Athol, Mass.

SEALS, Oil
American Felt Co., New York, N. Y.
Armstrong Cork Co., Lancaster, Pa.
Booth Felt Co., Brooklyn, N. Y.
Chicago Rawhide Mfg. Co., Chicago
Felters Co., Boston, Mass.
Gits Bros Mfg. Co., Chicago
Graton & Knight Co., Worcester, Mass.
Johns-Manville, N. Y. C.
National Motor Brgs. Co., Oakland, Calif.

SEPARATORS, Centrifugal
Barrett Co., Leon J., Worcester, Mass.
*DeLaval Separator Co., N. Y. C.
*National Acme Co., Cleveland, O.
Ransohoff, Inc., N., Cincinnati, O.
Rochester Engrg. & Centrifugal Corp., Rochester, N. Y.
*Tolhurst Div. of American Machine & Metals Mfg. Corp., Troy, N. Y.

SETS, Rivet
*American Swiss File & Tool Co., Elizabeth, N. J.
*Bethlehem Steel Co., Bethlehem, Pa.
Chicago Pneumatic Tool Co., N. Y. C.
Chicago Rivet & Machine Co., Chicago
*Cleveland Punch & Shear Works Co., Cleveland, O.
Independent Pneumatic Tool Co., Chicago
Ingersoll-Rand Co., N. Y. C.
Kane & Roach, Syracuse, N. Y.
Peck, Stow & Wilcox Co., Southington, Conn.

SETTERS, Nut (See TOOLS, Portable)

SETTERS, Stud (See also TOOLS, Portable)
Chicago Pneumatic Tool Co., N. Y. C.
Ingersoll-Rand Co., N. Y. C.
Titan Tool Co., Fairview, Pa.

SHAFTING, Steel
*Bethlehem Steel Co., Bethlehem, Pa.
Bliss & Laughlin Inc., Harvey, Ill., & Buffalo, N. Y.
Crucible Steel Co. of America, N. Y. C.
Cumberland Steel Co., Cumberland, Md.
Dodge Mfg. Corp., Mishawaka, Ind.
*Earle Gear & Mach. Co., Philadelphia
Heppenstall Co., Pittsburgh, Pa.
International Nickel Co. Inc., N. Y. C.
Jones & Laughlin Steel Corp., Pittsburgh, Pa.
Link-Belt Co., Chicago
Monarch Steel Co., Indianapolis, Ind.
National Tube Co. (Subsidiary U. S. Steel Corp.), Pittsburgh
Philadelphia Steel & Iron Co., Conshohocken, Pa.
*Ryerson & Son, Jos. T., Chicago
*Scully Steel Products Co., N. Y. C.
Union Drawn Steel Div. Republic Steel Co., Massillon, O.
*Wyckoff Drawn Steel Co., Pittsburgh

SHAFTS, Flexible
*Dumore Co., Racine, Wis.
*Errington Mech. Lab., Stapleton, N. Y.
*Haskins Co., R. G., Chicago
Jarvis Co., Charles L., Middletown, Conn.
Mall Tool Co., Chicago
*Pratt & Whitney Div., Niles-Bement-Pond Co., Hartford, Conn.
Stow Mfg. Co., Binghamton, N. Y.
Strand Co., N. A., Chicago
U. S. Electrical Tool Co., Cincinnati
*Walker-Turner Co., Inc., Plainfield, N. J.
White Dental Mfg. Co., S. S., N. Y. C.

SHAPERS, Horizontal
*American Tool Works Co., Cincinnati
*Ames Co., B. C., Waltham, Mass.
*Atkins & Co., E. C., Indianapolis, Ind.
Atlas Press Co., Kalamazoo, Mich.
Automotive Maintenance Machinery Co., N. Chicago, Ill.
*Bryant Machinery & Engrg. Co., Chicago.
*Cincinnati Shaper Co., Cincinnati
Cochrane-Bly Co., Rochester, N. Y.
Columbia Machine Tool Co., Hamilton, O.
Gould & Eberhardt, Irvington, N. J.
*Hanson-Whitney Machine Co., Hartford, Conn.
*Hendey Machine Co., Torrington, Conn.
*Indian White Eagle Engrg. & Machine Works, Brooklyn, N. Y.
Mesta Machine Co., Pittsburgh, Pa.
Morton Mfg. Co., Muskegon Heights, Mich.

Cut Costs—Increase Production
with
DETROIT POWER SCREWDRIVERS

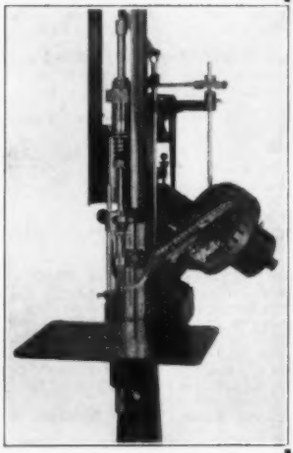
•

Three Models Available

•

These MAGAZINE FEED POWER SCREW DRIVERS DRIVE SCREWS FASTER THAN EVER BEFORE

•



Model B

Machine screws, wood screws, brass screws, aluminum screws, self-tapping screws, drive screws, cap screws, special screws, washer assembled screws.

Standard heads, special heads, Phillips heads, slotless heads.

Send Samples for Production Estimates

Detroit Power Screwdriver Co.
5377 ROHNS AVENUE DETROIT, MICH.

"ZX" 7" UNIVERSAL SHAPER
ALSO SIZES 4-in., 6-in., 10-in.

This HAND and POWER 7" SHAPER and VERTICAL SLOTTER does any intricate work often impossible to do on a regular shaper—a universal precision machine tool needed in every toolroom and manufacturing plant. Numerous attachments for surface and milling cutter grinding, boring, milling, engraving, graduating, etc. Manufactured since 1922 by

INDIAN WHITE EAGLE ENGINEERING & MACHINE WORKS
Factory: Foot of 18th Street, Brooklyn, N. Y.

SMITH & MILLS
CRANK SHAPERS
sizes 12" to 32" stroke
THE SMITH & MILLS CO. Cincinnati, Ohio

WHERE-TO-BUY DIRECTORY

** Indicates further information to be found in advertising pages.*

*Ohio Machine Tool Co., Kenton, O.
*Pratt & Whitney Div. Niles-Bement-Pond Co., Hartford, Conn.
*Reed-Prentice Co., Worcester, Mass.
Rockford Machine Tool Co., Rockford, Ill.
*Smith & Mills Co., Cincinnati, O.
Western Machine Tool Works, Holland, Mich.

SHAPERS, Vertical
*Ames Co., B. C., Waltham, Mass.
Cochrane-Bly Co., Rochester, N. Y.
Columbia Machine Tool Co., Hamilton, O.
*Hanson-Whitney Machine Co., Hartford, Conn.
*Indian White Eagle Engrg. & Machine Works, Brooklyn, N. Y.
Marburg Bros., Inc., N. Y. C.
Nixon Gear & Machine Co., Syracuse, N. Y.
*Pratt & Whitney Div. Niles-Bement-Pond Co., Hartford, Conn.
*Rockford Machine Tool Co., Rockford, Ill.

SHAVERS, Gear
Detroit Tap & Tool Co., Detroit, Mich.
*Ex-Cell-O Corp., Detroit, Mich.
*Fellows Gear Shaper Co., Springfield, Vt.
Gorham Tool Co., Detroit, Mich.
*Michigan Tool Co., Detroit, Mich.
*National Broach & Machine Co., Detroit

SHAVING MACHINES
*Consolidated Machine Tool Corp., Rochester, N. Y.
Cross Gear & Machine Co., Detroit
*Michigan Tool Co., Detroit, Mich.

SHEARS, Hand
*Black & Decker Mfg. Co., Towson, Md.
*Buffalo Forge Co., Buffalo, N. Y.
Canton Fdry. & Mach. Co., Cleveland
Champion Blower & Forge Co., Lancaster, Pa.
Crescent Tool Co., Jamestown, N. Y.
Hanna Engrg. Works, Chicago
Hendley & Whittemore Co., Beloit, Wis.
Mesta Machine Co., Pittsburgh, Pa.
*Niagara Machine & Tool Works, Buffalo, N. Y.
Peck, Stow & Wilcox Co., Southington, Mass.
Service Machine Co., Elizabeth, N. J.
Van Dorn Elec. Tool Co., Towson, Md.
Whitney Metal Tool Co., Rockford, Ill.
Wiss & Sons Co., J., Newark, N. J.

SHEARS, Rotary
Birdsboro Steel Fdry. & Mach. Co., Birdsboro, Pa.
Bliss Co., E. W., Brooklyn, N. Y.
*Cleveland Punch & Shear Works Co., Cleveland, O.
*Consolidated Machine Tool Corp., Rochester, N. Y.
Detroit Tap & Tool Co., Detroit, Mich.
*Disston & Sons, Inc., Henry, Tacony, Philadelphia
*Illinois Tool Works, Chicago
Kane & Roach Inc., Syracuse, N. Y.
Mesta Machine Co., Pittsburgh, Pa.
*Michigan Tool Co., Detroit, Mich.
*Niagara Machine & Tool Works, Buffalo, N. Y.
Peck, Stow & Wilcox Co., Southington, Conn.
Quickwork-Whiting Corp., Harvey, Ill.
*Ryerson & Son, Inc., Jos. T., Chicago
*Schatz Mfg. Co., Poughkeepsie, N. Y.
United Engrg. & Fdry. Co., Pittsburgh
Williams, White & Co., Moline, Ill.

SHEARS, Squaring
Beatty Machine & Mfg. Co., Hammond, Ind.
Bliss Co., E. W., Brooklyn, N. Y.
*Cincinnati Shaper Co., Cincinnati, O.
*Cleveland Punch & Shear Works Co., Cleveland, O.
Columbia Machine Tool Co., Hamilton, O.
*Consolidated Machine Tool Corp., Rochester, N. Y. (Hilles & Jones Div.)
Dodge Mfg. Corp., Mishawaka, Ind.
Kent-Owens Machine Co., Toledo, O.
Mesta Machine Co., Pittsburgh, Pa.
*Mitts & Merrill, Saginaw, Mich.
*Niagara Machine & Tool Works, Buffalo, N. Y.
Peck, Stow & Wilcox Co., Southington, Conn.
Pels & Co., Henry, N. Y. C.
*Schatz Mfg. Co., Poughkeepsie, N. Y.
United Engrg. & Fdry. Co., Pittsburgh

SHEAVES, "V" Belt
*Allis-Chalmers Mfg. Co., Milwaukee
American Pulley Co., Philadelphia
Boston Gear Works, N. Quincy, Mass.
Dayton Rubber Mfg. Co., Dayton, O.
Dodge Mfg. Corp., Mishawaka, Ind.
*Earle Gear & Machine Co., Philadelphia
Foote Gear Works, Inc., Cicero, Ill.
Gates Rubber Co., Denver, Colo.
Goodrich Co., B. F., Akron, O.
Hanson Clutch & Machinery Co., Tiffin, O.
*Hill Acme Co., Cleveland
Medart Co., St. Louis, Mo.
Mesta Machine Co., Pittsburgh, Pa.
Miller & Co., Carl A., N. Y. C.
National-Erie Corp., Erie, Pa.
Rockwood Mfg. Co., Indianapolis, Ind.
Stephens-Adamson Mfg. Co., Aurora, Ill.
Worthington Pump & Machinery Corp., Harrison, N. J.

SHEET-METAL WORKING MACHINERY
(See BRAKES, Bending Press; DIES, Sheet-Metal; FORMING Machines; NIBBLERS; PRESSES; REELS, Stripstock; RIVETERS; ROLLS, Bending; SHEARS; STITCHERS, Metal).
Ams, Max, Machine Co., Bridgeport, Conn.
Berger Bros. Co., Philadelphia, Pa.
Bertsch & Co., Cambridge City, Mass.
Bliss Co., E. W., New York
Budd Mfg. Co., Edw. G., Philadelphia, Pa.
Burritt & Bros., O. W., Weedsport, N. Y.
*Campbell, Andrew C. Div. American Chain & Cable Co., Inc., Bridgeport, Conn.
Cameron Can Machinery Co., Chicago, Ill.
Canton Fdry. & Machine Corp., Cleveland, Ohio
Chambersburg Engrg. Co., Chambersburg, Pa.
*Clearing Machine Co., Chicago, Ill.
Conran, Frederick M., Newark, N. J.
Danzer Metal Works Co., Hagerstown, Md.
Dreis & Krump Mfg. Co., Chicago, Ill.
Engrg. & Research Corp., Washington, D. C.
*Etna Machine Co., Toledo, Ohio
Excelsior Tool & Machine Co., E. St. Louis, Mo.
*Farrel-Birmingham Co., Inc., Ansonia, Conn.
Ferracute Machine Co., East Bridgeton, N. J.
G. D. S. Machy. & Supply Co., Inc., N. Y. C.
Hallden Machine Co., Thomaston, Conn.
Helwig Mfg. Co., St. Paul, Minn.
*Henry & Wright Mfg. Co., Hartford, Conn.
Hilyard Co., The, Norristown, Pa.
Imperial Tool & Machine Co., Indianapolis, Ind.
Ingels Elbow Machine Corp., Chicago, Ill.
Kane & Roach, Inc., Syracuse, N. Y.
Lake Erie Engrg. Corp., Buffalo, N. Y.
Lewis Fdry. & Machine Co., Div. of Blaw-Knox Co., Pittsburgh, Pa.
McKay Machine Co., Youngstown, Ohio
McKinney Tool & Mfg. Co., Cleveland, Ohio
Magee Sheet Metal Machy. Co., Ypsilanti, Mich.
Marshalltown Mfg. Co., Marshalltown, Iowa
Mechanical Handling Systems, Inc., Detroit, Mich.
Moore Machinery Co., San Francisco, Calif.
Moyer, J. N., Philadelphia, Pa.
New Albany Mach. Mfg. Co., New Albany, Ind.
*Niagara Mach. & Tool Works, Buffalo, N. Y.
Nichols, L. O., Kansas City, Mo.
Ohl & Co., Geo. A., Newark, N. J.
Peck, Stow & Wilcox Co., Southington, Conn.
Pellow Machine Co., Detroit, Mich.
Pels & Co., Henry, New York City
*Perkins Machine Co., Warren, Mass.
Quickwork Co., Chicago, Ill.
Rafter Machine Co., Belleville, N. J.
*Ryerson & Son, Inc., Jos. T., Chicago, Ill.
*Savage Co., W. J., Knoxville, Tenn.
*Schatz Mfg. Co., Poughkeepsie, N. Y.
Service Machine Co., Elizabeth, N. J.
Shuster Co., F. B., New Haven, Conn.
Standard Machinery Co., Providence, R. I.

"SUPER-SWIFT AIR EXPRESS HELPS KEEP PRODUCTION MOVING AT TOP SPEED!"

. . . says William Kennedy, Manager of The American Machinist

All industry—and especially metal-working, the key industry in armament production—must move full speed ahead during 1941. William Kennedy, like thousands of men in metal-working, is grateful today for the availability of super-swift shipping, to minimize costly and dangerous production delays.

With Air Express, heavy machinery and equipment, replacement parts, and vitally needed assembly parts and materials, fly through the sky at 3 miles a minute. *Special* pick-up, *special* delivery is made in all cities and principal towns within our regular vehicle limits at *no extra charge.* Coordinated air and rail service gives nation-wide coverage. For service, phone RAILWAY EXPRESS, AIR EXPRESS DIVISION.

AIR EXPRESS

The Sky Speed-way for Modern Industry

WHERE-TO-BUY DIRECTORY

** Indicates further information to be found in advertising pages.*

SHEET-METAL MACHY. (Cont.)
Stanley Electric Tool Div., The Stanley Works, New Britain, Conn.
Steelweld Machinery Co., Cleveland, Ohio
Stolp Co., Inc., Geneva, N. Y.
Streine Tool & Mfg. Co., New Bremem, Ohio
Thomas Machine Mfg. Co., Pittsburgh, Pa.
Tishken Products, Detroit, Mich.
Toledo Mach. & Tool Co., Toledo, Ohio
*Torrington Mfg. Co., Torrington, Conn.
*V. & O. Press Co., Hudson, N. Y.
Verdin, Kappes & Verdin Co., Cincinnati, Ohio
Verson Allsteel Press Co., Chicago, Ill.
Whiting Co., Geo., Chicago, Ill.
Whitney Metal Tool Co., Rockford, Ill.
Williams, White & Co., Moline, Ill.
Yoder Co., Cleveland, Ohio
*Zeh & Hahnemann Co., Newark, N. J.

SHELL-MAKING Machinery
*Coulter Machine Co., James, Bridgeport, Conn.
*LeMaire Tool & Mfg. Co., Dearborn, Mich.

SHIFTERS, Belt
Bond Foundry & Machine Co., Manheim, Pa.
Diamond Machine Co., Providence, R. I.
Dodge Mfg. Corp., Mishawaka, Ind.
Falls Clutch & Machinery Co., Cuyahoga Falls, O.
Hill Acme Co., Cleveland
Howell & Co., R. B., Minneapolis, Minn.
Medart Co., St. Louis, Mo.
*Ready Tool Co., Bridgeport, Conn.
Reznor Mfg. Co., Mercer, Pa.
Robertson, W., Machine & Foundry Co., Buffalo, N. Y.
Royersford Foundry & Machine Co., Inc., Royersford, Pa.
*S.K.F. Industries, Inc., Philadelphia
Wood's, T. B., Sons Co., Chambersburg, Pa.

SHIMS, Bearing, Plain & Laminated
Akron Metallic Gasket Co., Akron, O.
Laminated Shim Co., L. I. City, N. Y.
National Motor Bearing Co., Oakland, Calif.
Victor Mfg. & Gasket Co., Chicago

SHIPPING SERVICE
*Railway Express Agency, All Principal Cities.

SKIDS (See TRUCKS, Hand)

SLEEVES & SOCKETS, Drill
*Cleveland Twist Drill Co., Cleveland, O.
Greenfield Tap & Die Corp., Greenfield, Mass.
*Hardinge Brothers, Inc., Elmira, N. Y.
Morrison Machine Products Div., Elmira, N. Y.
Morse Twist Drill & Mach. Co., New Bedford, Mass.
*National Twist Drill & Tool Co., Detroit
*Pratt & Whitney Div. Niles-Bement-Pond Co., Hartford, Conn.
*Scully-Jones & Co., Chicago
Standard Tool Co., Cleveland, Ohio
*Union Twist Drill Co., Athol, Mass.
Whitman & Barnes, Detroit, Mich.

SLOTTERS
Baker Bros., Inc., Toledo, O.
Cochrane-Bly, Rochester, N. Y.
*Consolidated Machine Tool Corp., Rochester, N. Y.
*General Machinery Corp. (Niles Tool Wks. Div.), Hamilton, O.
Greenfield Tap & Die Corp., Greenfield, Mass.
Lindgren & Son Mfg. Co., Bridgeport, Conn.
Morton Mfg. Co., Muskegon Heights, Mich.
Waterbury Farrel Fdry. & Mach. Co., Waterbury, Conn.

SOCKETS, Drill (See SLEEVES & SOCKETS, Drill)

SOLDER
American Smelting & Refining Co., N. Y. C.
Belmont Smelting & Refining Works, Inc., Brooklyn, N. Y.
Bohm Aluminum & Brass Corp., Detroit
Cambridge Smelting Co., Cambridge, Mass.
Columbia Smelting & Refining Works, Brooklyn, N. Y.
*Disston & Sons, Inc., Henry, , Tacony, Philadelphia, Pa.
Eagle-Picher Lead Co., Cincinnati, O.
Eutectic Welding Alloys, Inc., New York, N. Y.
Gardiner Metal Co., Chicago
Glaser Lead Co., Brooklyn, N. Y.
Kester Solder Co., Chicago, Ill.
Michigan Smelting & Refining Co., Detroit, Mich.
National Bearing Metals Corp., St. Louis, Mo.
National Lead Co., N. Y. C.
Philadelphia Solder Co., Philadelphia
*Ruby Chemical Co., Columbus, Ohio
U. S. Smelting Works, Philadelphia

SOLVENTS, OIL & GREASE
Blakeslee & Co., G. S., Chicago
Creative Chemical Co., Pittsburgh, Pa.
Detroit Rex Products Co., Detroit, Mich.
*Oakite Products, Inc., N. Y. C.

SPINDLES, Machine
American Hollow Boring Co., Erie, Pa.
*Bryant Chucking Grinder Co., Springfield, Vt.
*Dumore Co., Racine, Wis.
*Ex-Cell-O Corp., Detroit, Mich.
*Heald Machine Co., Worcester, Mass.
*Monarch Machine Tool Co., Sidney, O.
*Rivett Lathe & Grinder, Inc., Brighton, Boston, Mass.
*Scully-Jones & Co., Chicago
*Standard Electrical Tool Co., Cincinnati, O.

SPRAYERS, Metal
Master Metal Spray Co., Oakland, Calif.
Metallizing Co. of America, Los Angeles, Cal.
Metallizing Engrg. Co., N. Y. C.
Metals Coating Co. of America, Philadelphia, Pa.
Metalspray Co., Los Angeles, Calif.
Schori Process Corp., L. I. City, N. Y.
Turner Brass Works, Sycamore, Ill.

SPRAYERS, Paint
Beach Air Brush Co., Willard C., Harrison, N. J.
Binks Mfg. Co., Chicago
Breuer Electric Mfg. Co., Chicago
Clements Mfg. Co., Chicago
Crown Spray Gun Mfg. Co., Los Angeles
Curtis Pneumatic Machy. Co., St. Louis
Dayton Pump & Mfg. Co., Dayton, O.
DeVilbiss Co., Toledo, O.
Eclipse Air Brush Co., Inc., Newark, N. J.
Electric Sprayit Co., Milwaukee, Wis.
Essick Machinery Co., Los Angeles, Calif.
*Hobart Bros. Co., Troy, O.
Hudson, H. D., Mfg. Co., Chicago
Ideal Commutator Dresser Co., Sycamore, Ill.
Imperial Brass Mfg. Co., Chicago
Kellogg Div., Am. Brake Shoe & Fdry. Co., Rochester, N. Y.
Metal Specialties Mfg. Co., Chicago
Milburn, Alexander, Co., Baltimore
Paasche Airbrush Co., Chicago
Saylor-Beall Mfg. Co., Detroit, Mich.
Scaife, Wm. B., & Sons Co., Oakmont, Pa.
Simons Paint Spray Brush Co., Dayton, O.
Simplex Spray Equipt. Co., Chicago
Smith, D. B. & Co., Inc., Utica, N. Y.
Spray Engrg. Co., Somerville, Mass.
U. S. Air Compressor Co., Cleveland, O.

SPRING-COILING & FORMING MACHINES
Baird Machine Co., Bridgeport, Conn.
Sleeper & Hartley, Inc., Worcester, Mass.

SPRING TESTERS
American Mach. & Metals, Inc., N. Y. C.
Instrument Specialties Co., Little Falls, N. J.
Link Engrg. & Mfg. Co., Detroit, Mich.

SPRINGS, Coil
American Spiral Spring & Mfg. Co., Pittsburgh, Pa.
American Spring & Mfg. Corp., Holly, Mich.
American Steel & Wire Co., Cleveland, O.
Barnes Co., Wallace, Div. of Associated Spring Corp., Bristol, Conn.
Chicago Coil Spring Co., Chicago
Cleveland Wire Spring Co., Cleveland, O.
Crucible Steel Co. of Amercia, N. Y. C.
Cuyahoga Spring Co., Cleveland, O.
Peck Spring Co., Plainville, Conn.
Raymond Mfg. Co., Div. of Associated Spring Corp., Corry, Pa.
Wickwire-Spencer Steel Co., N. Y. C.

SPRINGS, Die
*Allen Mfg. Co., Hartford, Conn.
*Danly Machine Specialties, Chicago
U. S. Tool Co., Ampere, N. J.

SPROCKETS (See GEARS, Cut)

SQUARES, Precision (See BLOCKS, Precision Gage)

STAMPINGS, Metal
Aluminum Goods Mfg. Co., Manitowoc, Wis.
American Brass Co., Waterbury, Conn.
Bates Co., H. O., 249 N. Broad St., Elizabeth, N. J.
Bridgeport Brass Co., Bridgeport, Conn.
*Continental Machines, Inc., Minneapolis, Minn.
Dahlstrom Metallic Door Co., Jamestown, N. Y.
*Dayton Rogers Mfg. Co., Minneapolis, Minn.
Grand Haven Stamped Products, Grand Haven, Mich.
Hunter Pressed Steel Co., Lansdale, Pa.
Laminated Shim Co. Inc., L. I. City, N. Y.
Metalcraft Mfg. Corp., H. K., N. Y. C.
Murray Mfg. Co., D. J., Wausau, Wis.
Palmer-Bee Co., Detroit, Mich.
Powell Pressed Steel Co., Hubbard, Ohio
Revere Copper & Brass Inc., N. Y. C.
Scovill Mfg. Co., Waterbury, Conn.
Seamless Prod. Co., Inc., N. Y. C.
*Standard Pressed Steel Co., Jenkintown, Pa.
*Sundstrand Machine Tool Co., Rockford, Ill.
Transue & Williams Steel Forging Corp., Alliance, O.
Worcester Pressed Steel Co., Worcester, Mass.

STAMPS & HOLDERS, Steel, Safety
*Cunningham Co., M. E., Pittsburgh, Pa.
Bates Co., H. O., Elizabeth, N. J.
New Method Steel Stamp, Inc., Detroit
*Noble & Westbrook Mfg. Co., East Hartford, Conn.

STAMPS, Steel (See DIES, Marking & Embossing)

STARTERS, Motor (See CONTROLLERS, Motor)

STEEL, Die
*Allegheny Ludlum Steel Corp., Pittsburgh
Anchor Drawn Steel Co., Pittsburgh
*Bethlehem Steel Co., Bethlehem, Pa.
*Carpenter Steel Co., Reading, Pa.
*Cleveland Twist Drill Co., Cleveland, O.
Colonial Steel Co., Pittsburgh, Pa.
Columbia Tool Steel Co., Chicago Hts., Ill.
Crucible Steel Co. of America, N. Y. C.
Driver-Harris Co., Harrison, N. J.
Finkl & Sons Co., A., Chicago
*Firth-Sterling Steel Co., McKeesport, Pa.
Heppenstall Co., Pittsburgh, Pa.
Jessop Steel Co., Washington, Pa.
Latrobe Electric Steel Co., Latrobe, Pa.
Milne & Co., A., N. Y. C.
*Ryerson & Son, Inc., Jos. T., Chicago
*Timken Steel & Tube, Div. of Timken Roller Bearing Co., Canton, O.
Universal Steel Co., Bridgeville, Pa.
Vanadium Alloys Steel Co., Pittsburgh

STEEL-MILL PRODUCTS
Acme Steel Co., Chicago (Hot- and cold-rolled strip steel and strip stainless steel)
Advance Foundry Co., Dayton, O.
*Allegheny Ludlum Steel Corp., Pittsburgh, Pa. (Steel and stainless steel sheets, plates, tubes, wire and strip)
American Rolling Mill Co., Middletown, Ohio (Iron, steel and stainless steel sheets, plate, strip and coils and spiral welded pipe)
American Steel & Tin Plate Co., Pittsburgh, Pa.
*American Steel & Wire Co., Cleveland, O. (Cold-finished steel bars, wire and wire products)
Anchor Drawn Steel Co., Pittsburgh, Pa.
*Bethlehem Steel Co., Bethlehem, Pa.
Bliss & Laughlin, Inc., Harvey, Ill. (Cold-finished bars, shafting, screw stock)
Buffalo Bolt Co., North Tonawanda, N. Y. (Merchant and hot-rolled bars, hot-rolled coiled flats, wire)
Byers, A. M., Co., Pittsburgh, Pa. (Plates, sheets, billets, bar iron, pipe, etc.)
*Carnegie-Illinois Steel Corp., Pittsburgh
*Carpenter Steel Co., Reading, Pa.
Chemical Foundation, Inc., N. Y. C.
Colonial Steel Co., Pittsburgh, Pa.
*Columbia Steel Co. (Subsidiary U. S. Steel), San Francisco, Calif.
Columbia Tool Steel Co., Chicago Hts., Ill.
Copperweld Steel Co., Glassport, Pa.
Crucible Steel Co. of America, N. Y. C.
*Disston, Henry, & Sons, Inc., Tacony, Philadelphia, Pa.
Edwards Mfg. Co., Cincinnati, O. (Iron and steel corrugated and stainless steel sheets, etc.)
*Firth-Sterling Steel Co., McKeesport, Pa.
Harrisburg Steel Corp., Harrisburg, Pa.
Heller Brothers Co., Newark, N. J.
Highland Iron & Steel Co., Terre Haute, Ind.
*Ingersoll Steel & Disc, Div. Borg-Warner Corp., New Castle, Ind.
Inland Steel Co., Chicago, Ill. (Sheets, strip, tin-mill and bar-mill products, plates, shapes, rail steel, etc.)
Jessop Steel Co., Washington, Pa. (stainless)
Jones & Laughlin Steel Corp., Pittsburgh
Kidd Drawn Steel Co., Aliquippa, Pa. (Key steel [Woodruff] and special shapes)
Kroydon Co., Maplewood, N. J. (Seamless Tubing, etc.)
LaSalle Steel Co., Chicago, Ill. (Shafting and cold-finish bar steel)
Latrobe Elec. Steel Co., Latrobe, Pa.
Lyon, Conklin & Co., Inc., Baltimore, Md. (Sheet metal)
Milne & Co., A., N. Y. C.
Monarch Steel Co., Indianapolis, Ind.
O'Leary, Arthur J., & Son Co., Chicago
Philadelphia Steel & Wire Corp., Philadelphia, Pa.
*Pittsburgh Steel Co., Pittsburgh, Pa.
Pittsburgh Tool Steel Wire Co., Monaca, Pa. (Cold-drawn steel—alloy, tool, high-speed and special shapes)
Prosser & Sons, Thos., N. Y. C.
Republic Steel Corp., Cleveland, O.
Roper, Geo. D., Corp., Rockford, Ill.
Rustless Iron & Steel Corp., Baltimore, Md.
*Ryerson, & Son Co., Jos. T., Chicago
Sandvik Steel, Inc., New York, N. Y. (Hot-rolled steel bars, bands and tubing, cold-rolled steel bars and strip, cold-drawn bars and tubing)

Wedge Grip Holder

SAFETY HOLDERS--for every purpose Hand, Sledge, Axe and Box-Type Models.
SAFETY LETTERS AND FIGURES Heavy Bevel, Light Bevel, Wedge-Grip styles.
Special Stamps and Holders designed for unusual markings.
Write for Prices and Literature

SAFETY LETTERS AND FIGURES

M. E. CUNNINGHAM CO.
95 EAST CARSON ST. PITTSBURGH, PA.

WHERE-TO-BUY DIRECTORY

** Indicates further information to be found in advertising pages.*

*Scully Steel Products Co. (Subsidiary U. S. Steel Corp.), N. Y. C.
*Simonds Saw and Steel Co., Fitchburg, Mass. (Flat ground stock)
Sheffield Steel Corp., Kansas City, Mo. (Blue annealed sheets, ingots, blooms, billets, plates, etc.)
*Timken Steel & Tube, Div. Timken Roller Bearing Co., Canton, O.
Union Drawn Steel Div., Republic Steel Corp., Massillon, O. (Cold-finished steel)
Universal Steel Co., Bridgeville, Pa.
Vanadium Alloys Steel Co., Pittsburgh, Pa.
Wheeling Corrugating Co., Wheeling, W. Va. (Sheet-steel products, wire and wire products, roofing, etc.)
Wheeling Steel Corp., Wheeling, W. Va. (Sheet steel, wire and wire products, pipe, roofing, etc.)
Worcester Pressed Steel Co., Worcester, Mass.
*Wyckoff Drawn Steel Co., Pittsburgh, Pa.
Youngstown Sheet & Tube Co., Youngstown, O.

STEEL, Stainless (See preceding classification)

STEEL, Tool
Advance Foundry Co., Dayton, O.
*Allegheny-Ludlum Steel Corp., Pittsburgh, Pa.
Anchor Drawn Steel Co., Pittsburgh, Pa.
*Bethlehem Steel Co., Bethlehem, Pa.
*Carnegie-Illinois Steel Corp., Subsidiary U. S. Steel Corp., Pittsburgh, Pa.
*Carpenter Steel Co., Reading, Pa.
*Cleveland Twist Drill Co., Momax Div., Cleveland, Ohio
Colonial Steel Co., Pittsburgh, Pa.
*Columbia Steel Co., Subsidiary U. S. Steel Corp., San Francisco, Calif.
Columbia Tool Steel Co., Chicago Hts., Ill.
Copperweld Steel Co., Glassport, Pa.
Crucible Steel Co. of America, N. Y. C.
*Firth-Sterling Steel Co., McKeesport, Pa.
*Foote Bros. Gear & Machine Co., Chicago
Gorham Tool Co., Detroit, Mich.
Heppenstall Co., Pittsburgh, Pa.
*Ingersoll Steel & Disc, Div. Borg-Warner Corp., Newcastle, Ind.
Jessop Steel Co., Washington, Pa.
Latrobe Electric Steel Co., Latrobe, Pa.
Milne & Co., A., N. Y. C.
Prosser & Son, Thos., N. Y. C.
Republic Steel Corp., Cleveland, O.
*Ryerson & Son, Inc., Jos. T., Chicago
*Scully Steel Products Co., N. Y. C.
*Timken Steel & Tube, Div. Timken Roller Bearing Co., Canton, O.
*United States Steel Corp., Pittsburgh
Universal Steel Co., Bridgeville, Pa.
Vanadium Alloys Steel Co., Pittsburgh
Verdin, Koppes, Verdin Co., Cincinnati, O.
*Williams & Co., J. H., N. Y. C.

STITCHERS, Metal
Bostitch, Inc., E. Greenwich, R. I.
Harris-Seybold-Potter Co., Dayton, O.
Quickwork-Whiting Corp., Harvey, Ill.

STOCKS, Dies & Cutters, Pipe
*Armstrong Bros. Tool Co., Chicago
Beaver Pipe Tools Inc., Warren, O.
*Butterfield Div. (Union Twist Drill Co.), Derby Line, Vt.
*Card Mfg. Co., S. W. (Div. Union Twist Drill Co.), Mansfield, Mass.
Crane Co., Chicago, Ill.
Greenfield Tap & Die Corp., Greenfield, Mass.
Morse Twist Drill & Mach. Co., New Bedford, Mass.
*Oster Mfg. Co., Cleveland, O.
Peters Tool Co., Milwaukee, Wis.
*Pratt & Whitney Co., Div. Niles-Bement-Pond Co., Hartford, Conn.
Ridge Tool Co., Elyria, Ohio
*Sheffield Gage Corp., Dayton, O.
Standard Tool Co., Cleveland, O.
Toledo Pipe Threading Machine Co., Toledo, O.
Wells Tool Co., Greenfield, Mass.
*Winter Bros. Co., Wrentham, Mass.

STONES, Sharpening
*Abrasive Co., Philadelphia, Pa.
*Bay State Abrastive Products Co., Westboro, Mass.
Behr-Manning Corp., Troy, N. Y.
Carborundum Co., Niagara Falls, N. Y.
*Norton Company, Worcester, Mass.

STRAIGHTEDGES (See **DIE-MAKERS' SUPPLIES**)

STRAIGHTENERS, Wire
Chambersburg Engrg. Co., Chambersburg, Pa.
*Cleveland Punch & Shear Works Co., Cleveland, O.
*Consolidated Machine Tool Corp., Rochester, N. Y. (Hilles & Jones Div.)
Peck, Stow & Wilcox Co., Southington, Conn.
Sleeper & Hartley, Inc., Worcester, Mass.
Shuster Co., F. B., New Haven, Conn.
*Springfield Machine Tool Co., Springfield, O.
U. S. Tool Co., Inc., Ampere, N. J.
Waterbury Farrel Foundry & Mach. Co., Waterbury, Conn.
*Watson-Stillman Co., Roselle, N. J.

STRAIGHTENING & SIZING MACHINES
Taylor Wilson Mfg. Co., McKees Rocks, Pa.

STRIPPERS, Wire
Artos Engrg. Co., Milwaukee, Wis.
Carlander, Henry, New York, N. Y.
France Mfg. Co., Cleveland, O.
Globe Tool & Engrg. Co., Dayton, O.
Ideal Commutator Dresser Co., Sycamore, Ill.
Midwestern Tool Co., Chicago
Novelty Electric Co., Philadelphia, Pa.
Pyramid Products Co., Chicago
Wire Stripper Co., Cleveland, O.

STUDS
*Bethlehem Steel Co., Bethlehem, Pa.
Billings & Spencer Co., Hartford, Conn.
Chase Brass & Copper Co., Waterbury, Conn.
Clark Bros. Bolt Co., Milldale, Conn.
Harper Co., H. M., Chicago
*Lamson & Sessions Co., Cleveland, O.
*National Acme Co., Cleveland, O.
Parker-Kalon Corp., N. Y. C.
Pheoll Mfg. Co., Chicago, Ill.
Republic Steel Corp., Cleveland, O.
*Strong, Carlisle & Hammond Co., Cleveland, O.

SUB-PRESSES & DIES (See Dies, Subpress)

SUPERFINISHING EQUIPMENT
*Foster Machine Co., Elkhart, Ind.
*Ohio Units Manufacturers, Dayton, O.

SURFACE-BROACHING MACHINES (See **BROACHING MACHINES**)

SWAGING MACHINES
*Etna Machine Co., Toledo, Ohio
*Hardinge Brothers, Inc., Elmira, N. Y.
Langelier Mfg. Co., Providence, R. I.
*Torrington Co., Torrington, Conn.
Waterbury Farrel Fdry. & Mach. Co., Waterbury, Conn.

SWITCHES, Electric
Allen-Bradley Co., Milwaukee
*Allis-Chalmers Mfg. Co., Milwaukee, Wis.
*Barber-Colman Co., Rockford, Ill.
Bristol Co., Waterbury, Conn.
*Brown Instrument Co., Philadelphia, Pa.
Clark Controller Co., Cleveland, O.
Colt's Patent Fire Arms Mfg. Co., Hartford, Conn.
Cutler-Hammer, Inc., Milwaukee, Wis.
Electric Controller & Mfg. Co., Cleveland
Euclid Electric & Mfg. Co., Euclid, O.
General Controls Co., San Francisco
General Electric Co., Schenectady, N. Y.
Leeds Electric & Mfg. Co., Hartford, Conn.
McDonnell & Miller, Chicago
Micro Switch Corp., Freeport, Ill.
Monitor Controller Co., Baltimore, Md.
Signal Engrg. & Mfg. Co., N. Y. C.
Square D Co., Milwaukee, Wis.
Struthers Dunn, Inc., Philadelphia, Pa.
Tork Clock Co., Inc., Mt. Vernon, N. Y.
Trumbull Electric Mfg. Co., Plainville, Conn.
Ward Leonard Electric Co., Mt. Vernon, N. Y.
*Westinghouse Electric & Mfg. Co., E. Pittsburgh, Pa.

SWITCHES, Limit
Allen-Bradley Co., Milwauukee, Wis.
*Barber-Colman Co., Rockford, Ill.
Clark Controller Co., Cleveland, O.
Cutler-Hammer, Inc., Milwaukee, Wis.
Electric Controller & Mfg. Co., Cleveland, O.
Euclid Electric & Mfg. Co., Euclid, O.
General Electric Co., Schenectady, N. Y.
Jefferson Electric Co., Bellwood, Ill.
Micro Switch Corp., Freeport, Ill.
Monitor Controller Co., Baltimore, Md.
*National Acme Co., Cleveland, O.
Partlow Corp., New Hartford, N. Y.
Photo Switch, Inc., Cambridge, Mass.
Production Instrument Co., Chicago
Spencer Thermostat Co., Attleboro, Mass.
Square D Co., Detroit, Mich.
Struthers Dunn, Inc., Philadelphia, Pa.
Ward Leonard Electric Co., Mt. Vernon, N. Y.
*Westinghouse Electric & Mfg. Co., E. Pittsburgh, Pa.

SWITCHES, Mercury
Acme Electric Heating Co., Boston
*Brown Instrument Co., Philadelphia, Pa.
Center & Giveen Co., Berkeley, Calif.
Durakool, Inc., Elkhart, Ind.
General Electric Co., Bridgeport, Conn.
McDonnell & Miller, Chicago, Ill.
Minneapolis-Honeywell Regulator Co., Minneapolis, Minn.
Powrex Switch Co., Waltham, Mass.
Struthers Dunn, Inc., Philadelphia, Pa.
Tork Clock Co., Inc., Mt. Vernon, N. Y.
Ward Leonard Electric Co., Mt. Vernon, N. Y.
*Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa.

SYSTEMS, Production & Tool Control
*McCaskey Register Co., Alliance, O.
Remington Rand, Inc., Buffalo, N. Y.

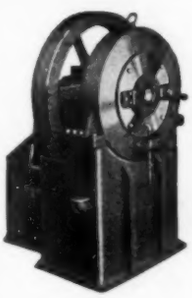
TACHOMETERS (See **INDICATORS, Speed**)

OSTER

MAKES
PIPE AND BOLT
THREADERS
•
HAND
SCREW MACHINES
•
A TOOL OR MACHINE FOR
PRACTICALLY *Every* REQUIREMENT

WRITE FOR **NEW 1941** CATALOG
OR TELL US YOUR PROBLEMS AND
WE'LL *Gladly* DISCUSS THEM WITH YOU

THE OSTER MANUFACTURING CO.
2049 EAST SIXTY FIRST ST.
CLEVELAND, OHIO



THE
TORRINGTON
ROTARY
SWAGING MACHINE

— with 4000 forceful squeezing hammer blows per minute—makes metal tougher and more elastic. Send for booklet—"The Torrington Swaging Machine."

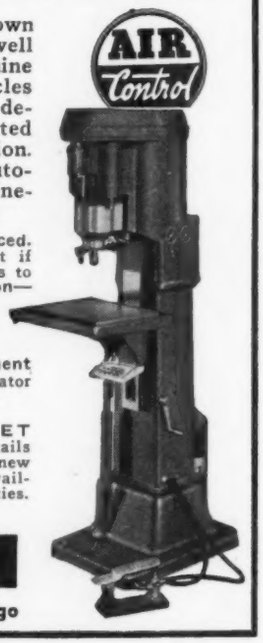
The Torrington Co., Swager Dept.
56 Field Street Torrington, Conn.

Again-YEARS AHEAD!

Haskins Type C Tapper with Built-In Air Control

Complete Air Control of down stroke, return stroke and dwell at top of stroke. Machine operates in continuous cycles as long as foot pedal is depressed, or is easily adjusted to single cycle operation. Quickly converted to use automatic air operated magazine-feed and dial-feed fixtures.

Tap Breakage Greatly Reduced. Tap head action so sensitive that if tap dulls or loads, machine refuses to work. **New Speed and Precision**—extremely close tolerances *consistently* maintained at high speed; same *cushioned* pressure and *uniform* results at 4 P.M. as at 8 A.M. **Human Element Replaced by Air Control**—operator merely loads and unloads work.



FREE BOOKLET gives complete details and shows this new Tapper at work. Available in three capacities. Write today.

R. G. HASKINS CO.

2760 W. Flournoy St., Chicago

Quick deliveries are our specialty
Either Standard or Special Taps
Cut and Ground thread, carbon and high-speed steel.

"The Right Tap at the Right Time"

THE WOOD & SPENCER CO.
CLEVELAND - OHIO

TANKS & CYLINDERS, Air
Binks Mfg. Co., Chicago
Bliss Co., E. W., Brooklyn, N. Y.
Chicago Pneumatic Tool Co., N. Y. C.
*Clearing Machine Corp., Chicago
Curtis Pneumatic Machinery Co., St. Louis, Mo.
Hanna Engrg. Works, Chicago
Hannifin Mfg. Co., Chicago
Ingersoll-Rand Co., N. Y. C.
*LeMaire Tool & Mfg. Co., Dearborn, Mich.
National Tube Co., Pittsburgh, Pa.
Northern Engrg. Works, Detroit, Mich.
Seamless Steel Equipt. Corp., N. Y. C.
Sullivan Machinery Co., Michigan City, Ind.
Skinner Chuck Co., New Britain, Conn.
*Tomkins-Johnson Co., Jackson, Mich.

TANKS, Quenching
*American Gas Furnace Co., Elizabeth, N. J.
Koven & Bros., Inc., L. O., Jersey City, N. J.
*Strong, Carlisle & Hammond Mach. Co., Cleveland, O.

TAPER PINS (See PINS, Dowel & Taper)

TAPES, Measuring
Chicago Steel Tape Co., Chicago
Dietzgen Co., Eugene, Chicago
Keuffel & Esser Co., Hoboken, N. J.
*Lufkin Rule Co., Saginaw, Mich.
*Starrett Co., L. S., Athol, Mass.

TAPPERS, Single & Multi-Spindle
Allen Co., Chas. G., Barre, Mass.
*Armstrong-Blum Mfg. Co., Chicago
Atlas Press Co., Kalamazoo, Mich.
*Avey Drilling Machine Co., Cincinnati
Baker Bros., Inc., Toledo, O.
*Barnes Drill Co., Rockford, Ill.
*Barnes Co., W. F. & John, Rockford, Ill.
Bodine Corp., Bridgeport, Conn.
*Bradford Machine Tool Co., Cincinnati, O.
*Buffalo Forge Co., Buffalo, N. Y.
Buhr Mach. Tool Co., Ann Arbor, Mich.
*Cincinnati Bickford Tool Co., Oakley, Cincinnati
*Cincinnati-Gilbert Machine Tool Co., Cincinnati, O.
Cosa Oversea Trading Corp., New York, N. Y.
Defiance Machine Works, Defiance, O.
*Delta Mfg. Co., Milwaukee, Wis.
*Ettco Tool Co., Brooklyn, N. Y.
Foote-Burt Co., Cleveland, O.
Frew Machine Co., Philadelphia, Pa.
*Geometric Tool Co., New Haven, Conn.
*Goss & deLeeuw Machine Co., New Britain, Conn.
Greenlee Bros. & Co., Rockford, Ill.
*Hamilton Tool Co., Hamilton, O.
*Haskins Co., R. G., Chicago
*Hill-Acme Co., Cleveland, O.
Hoefer Mfg. Co., Freeport, Ill.
Ingersoll Milling Machine Co., Rockford, Ill.
Jarvis, Chas. L., Middletown, Conn.
*Kaufman Mfg. Co., L. J., Manitowac, Wis.
*Kingsbury Machine Tool Corp., Keene, N. H.
Langelier Mfg. Co., Providence, R. I.
*Leland-Gifford Co., Worcester, Mass.
Mall Tool Co., Chicago
*Moline Tool Co., Moline, Ind.
*Murchey Mach. & Tool Co., Detroit
*National Acme Co., Cleveland
National Automatic Tool Co., Richmond, Ind.
National Machinery Co., Tiffin, O.
Procunier Safety Chuck Co., Chicago
Rickert-Shafer Co., Erie, Pa.
Rockford Drilling Machine, Div. Borg-Warner Corp., Rockford, Ill.
*Snyder Tool & Engrg. Co., Detroit
Stamets, Wm. K., Pittsburgh, Pa.
Western Machine Tool Works, Holland, Mich.

TAPS, Adjustable (See DIES, Adjustable)

TAPS, Hand & Machine, Solid
Alvord-Polk Tool Co., Millersburg, Pa.
American Screw Co., Providence, R. I. (Machine-screw).
Armstrong Mfg. Co., Bridgeport, Conn.
Bath, John & Co., Inc., Worcester, Mass.
Bay State Tap & Die Co., Mansfield, Mass.
Beslv, Charles H., & Co., Chicago
*Butterfield & Co., Division Union Twist Drill Co., Derby Line, Vt.
*Card, S. W., Mfg. Co., Div. of Union Twist Drill Co., Mansfield, Mass.
Champion Blower & Forge Co., Lancaster, Pa.
*Geometric Tool Co., New Haven, Conn.
Greenfield Tap & Die Corp., Greenfield, Mass.
*Hanson-Whitney Machine Co., Hartford, Conn.
Keystone Reamer & Tool Co., Millersburg, Pa.
Mayhew Steel Products, Inc., Shelburne Falls, Mass.
*Michigan Tool Co., Detroit, Mich.
Morse Twist Drill & Machine Co., New Bedford, Mass.
*Murchey Machine & Tool Co., Detroit, Mich.
*National Twist Drill & Tool Co., Detroit, Mich.
*Pratt & Whitney Div., Niles-Bement-Pond Co., Hartford, Conn.
Rickert-Shafer Co., Erie, Pa.
Standard Tool Co., Cleveland, O.
Threadwell Tap & Die Co., Greenfield, Mass.
*Union Twist Drill Co., Athol, Mass.
Whitman & Barnes, Detroit, Mich.
*Winter Brothers Co., Wrentham, Mass.
*Wood & Spencer Co., Cleveland, O.

TESTERS, Gear
*Brown & Sharpe Mfg. Co., Providence, R. I.
*Farrel-Birmingham Co., Buffalo, N. Y.
*Fellows Gear Shaper Co., Springfield, Vt.
*Gleason Works, Rochester, N. Y.
*Illinois Tool Works, Chicago
*Lees-Bradner Co., Cleveland, O.
*Michigan Tool Co., Detroit
Morse Twist Drill & Machine Co., New Bedford, Mass.
*National Broach & Machine Co., Detroit
Newark Gear-Cutting Machine Co., Newark, N. J.
Scherr Co., Geo., N. Y. C.
Zeiss, Carl, Inc., N. Y. C.

TESTING EQUIPMENT, Tension & Compression
*Baldwin-Southwark Div. of Baldwin Locomotive Works, Philadelphia
*Hartford Special Machinery Co., Hartford, Conn.
Hydraulic Press Mfg. Co., Mt. Gilead, O.
Olsen, Tinius, Testing Machine Co., Philadelphia
Riehle Testing Mach., Div. Am. Mach. & Metals Corp., E. Moline, Ill.

THREADING MACHINES, Die-Head
*Eastern Machine Screw Corp., New Haven, Conn.
*Geometric Tool Co., New Haven, Conn.
Greenfield Tap & Die Corp., Greenfield, Mass.
*Hill-Acme Co., Cleveland, O.
*Lees-Bradner Co., Cleveland
*Murchey Machine & Tool Co., Detroit
Rickert-Shafer Co., Erie, Pa.
*Taft Peirce Mfg. Co., Woonsocket, R. I.
*Waltham Machine Works, Waltham, Mass.

THREADING MACHINES, Roll
*Hill-Acme Co., Cleveland, O.
Schuyler, W. A., N. Y. C.
*V & O Press Co., Hudson, N. Y.
Waterbury-Farrel Foundry & Machine Co., Waterbury, Conn.

THERMOCOUPLES
*Brown Instrument Co., Philadelphia, Pa.
Foxboro Co., Foxboro, Mass.
Hoskins Mfg. Co., Detroit, Mich.
Leeds & Northrup Co., Philadelphia, Pa.
Taylor Instrument Cos., Rochester, N. Y.
Thwing-Albert Instrument Co., Philadelphia, Pa.

THERMOMETERS, Dial
American Schaeffer & Budenberg Div. Consolidated Ashcroft Hancock Co., Bridgeport, Conn.
Bristol Co., Waterbury, Conn.
*Brown Instrument Co., Philadelphia, Pa.
Consolidated Ashcroft Hancock Div., Bridgeport, Conn.
Foxboro Co., Foxboro, Mass.
Illinois Testing Lab., Inc., Chicago
Industrial Instrument Co., Akron, O.
Leeds & Northrup Co., Philadelphia, Pa.
Marsh Corp., Jas. P., Chicago
Philadelphia Thermometer Co., Philadelphia, Pa.
Powers Regulator Co., Chicago
Pyrometer Instrument Co., N. Y. C.
Sarco Co., Inc., N. Y. C.
*Strong, Carlisle & Hammond Co., Cleveland, O.
Tagliabue Mfg. Co., C. J., Brooklyn, N. Y.
Taylor Instrument Cos., Rochester, N. Y.
U. S. Gauge Co., N. Y. C.
Weston Electrical Inst. Corp., Newark, N. J.
Wheelco Instruments Co., Chicago

TIMERS, Production (See also COUNTERS, Revolution & Stroke)
Cramer Co. Inc., R. W. Centerbrook, Conn.
*National Acme Co., Richmond, Ind.
National Instrument Co., Boston, Mass.
Production Inst. Co., Chicago

TIMERS, Welding
Cramer Co. Inc., R. W., Centerbrook, Mass.
Cutler-Hammer Inc., Milwaukee, Wis.

WHERE-TO-BUY DIRECTORY

Electric Controller & Mfg. Co., Cleveland, O.
General Electric Co., Schenectady, N. Y.
Square D Co., Milwaukee, Wis.
Taylor Hall Welding Corp., Worcester, Mass.
Ward Leonard Elec. Co., Mt. Vernon, N. Y.
Welding Timer Mfg. Co., Inc., Newark, N. J.
Weltronic Corp., Detroit, Mich.
*Westinghouse Elec. & Mfg. Co., E. Pittsburgh, Pa.

TOOL HOLDERS (See HOLDERS, Tool)

TOOL POSTS, Lathe

*Armstrong Bros. Tool Co., Chicago
Colonial Broach Co., Detroit, Mich.
Detroit Tap & Tool Co., Detroit, Mich.
Four-Grip Tool Co., Paterson, N. J.
Gerstner Sons, H., Dayton, O.
*Gisholt Machine Co., Madison, Wis.
*Hendey Machine Co., Torrington, Conn.
McCrosky Tool Corp., Meadville, Pa.
*Michigan Tool Co., Detroit, Mich.
*O. K. Tool Co., Shelton, Conn.
*Pratt & Whitney, Div. Niles-Bement-Pond Co., Hartford, Conn.

TOOLS, Boring

*Armstrong Bros. Tool Co., Chicago
*Carboloy Co., Detroit, Mich.
*Cincinnati Lathe & Tool Co., Oakley, Cincinnati
Craley Mfg. Co., C. C., Shillington, Pa.
Davis Boring Tool Co. (Div. Larkin Packer Co.), St. Louis, Mo.
Eclipse Counterbore Co., Detroit, Mich.
*Ex-Cell-O Corp., Detroit, Mich.
*Foster Machine Co., Elkhart, Ind.
Four-Grip Tool Co., Paterson, N. J.
Gairing Tool Co., Detroit, Mich.
*Gisholt Machine Co., Madison, Wis.
Haynes Stellite Co., Kokomo, Ind.
*Heald Machine Co., Worcester, Mass.
*Illinois Tool Works, Chicago
Ingersoll Milling Machine Co., Rockford, Ill.
Kelly Reamer Co., Cleveland
*Lucas Machine Tool Co., Cleveland
McCrosky Tool Corp., Meadville, Pa.
*Michigan Tool Co., Detroit, Mich.
*Pratt & Whitney Co., Div. Niles-Bement-Pond Co., Hartford, Conn.
Prosser & Son., Thos., New York, N. Y.
*Ready Tool Co., Bridgeport, Conn.
*Scully-Jones & Co., Chicago
Stoody Co., Whittier, Calif.
Super-Tool Co., Detroit, Mich.
*Taft-Peirce Mfg. Co., Woonsocket, R. I.
*Warner & Swasey Co., Cleveland
Wesson Co., Detroit, Mich.
Westcott Chuck Co., Oneida, N. Y.
*Williams & Co., J. H., Buffalo, N. Y.

TOOLS, Box-Strapping

Acme Steel Co., Chicago
Graton & Knight Co., Worcester, Mass.
Stanley Works, New Britain, Conn.

TOOLS and PARTS, Cemented-Carbide

*Armstrong Bros. Tool Co., Chicago
*Barber-Colman Co., Rockford, Ill.
*Carboloy Co., Inc., Detroit, Mich.
Cimatool Co., Dayton, O.
Detroit Tap & Tool Co., Detroit, Mich.
*Disston and Sons, Inc., Henry, Tacony, Philadelphia, Pa.
Eclipse Counterbore Co., Detroit, Mich.
*Ex-Cell-O Corp., Detroit, Mich.
Fansteel Metallurgical Corp., No. Chicago, Ill.
*Firth-Sterling Steel Co., McKeesport, Pa.
Gairing Tool Co., Detroit, Mich.
*Illinois Tool Works, Chicago
Ingersoll Milling Machine Co., Rockford, Ill.
Jessop Steel Co., Washington, Pa.
McKenna Metals Co., Latrobe, Pa.
*Metal Carbides Corp., Youngstown, O.
*Michigan Tool Co., Detroit, Mich.
Morse Twist Drill & Mach. Co., New Bedford, Mass.
*Pratt & Whitney Div., Niles-Bement-Pond Co., Hartford, Conn.
Production Tool Co., Detroit, Mich.
Prosser & Son., Thos., New York, N. Y.
*Scully-Jones & Co., Chicago
Super Tool Co., Detroit, Mich.
Tungsten Carbide Tool Co., Detroit, Mich.
Tungsten Elec. Corp., Union City, N. J.
Vanadium Alloys Steel Co., Pittsburgh
*Vascoloy-Ramet Corp., Chicago
*Warner & Swasey Co., Cleveland, O.
Wesson Co., Detroit, Mich.
Willey's Carbide Tool Co., Detroit, Mich.

TOOLS, Diamond-Tipped

American Manganese Steel Div., Chicago Hgts., Ill.
Bausch & Lomb Optical Co., Rochester, N. Y.
*Crafts Co., Arthur A., Boston, Mass.
Driver-Harris Co., Harrison, N. J.
Gilmore & Co., F. F., Boston, Mass.
*Gorton Machine Co., Geo., Racine, Wis.
Kent-Owens Machine Co., Toledo, O.
Mesta Machine Co., Pittsburgh, Pa.
Micro Instrument Co., Cambridge, Mass.
*Norton Company, Worcester, Mass.
Smit & Son, J. K., N. Y. C.
Stark Tool Co., Waltham, Mass.
Super Tool Company, Detroit, Mich.
Wesson Co., Detroit, Mich.

TOOLS, Flexible-Shaft

*Dumore Co., Racine, Wis.
*Haskins Co., R. G., Chicago
Ideal Commutator Dresser Co., Sycamore, Ill.
Jarvis Co., Charles L., Middletown, Conn.
Mall Tool Co., Chicago
*Pratt & Whitney Div., Niles-Bement-Pond Co., Hartford, Conn.
Stanley Electrical Tool Div., Stanley Works, New Britain, Conn.
Stow Mfg. Co., Binghamton, N. Y.
Strand & Co., N. A., Chicago
U. S. Electrical Tool Co., Cincinnati, O.
*Walker-Turner, Inc., Plainfield, N. J.
White Dental Mfg. Co., S. S., Stapleton, N. Y.

TOOLS, Hand

*Allen Mfg. Co., Hartford, Conn.
American Instrument Co. Inc., Silver Spring, Md.
*American Swiss File & Tool Co., Elizabeth, N. J.
Apex Mach. & Tool Co., Dayton, O.
*Armstrong-Blum Mfg. Co., Chicago
*Armstrong Bros. Tool Co., Chicago
*Atkins & Co., E. C., Indianapolis, Ind.
Automotive Maintenance Machy. Co., No. Chicago, Ill.
Barnes Co., W. O., Detroit, Mich.
Blackhawk Mfg. Co., Milwaukee, Wis.
Bonney Forge & Tool Works, Allentown, Pa.
*Brown & Sharpe Mfg. Co., Providence, R. I.
*Butterfield Div. (Union Twist Drill Co.), Derby Line, Vt.
*Capewell Mfg. Co., Hartford, Conn.
*Carboloy Co., Detroit, Mich.
*Card Mfg. Co., S. W., Mansfield, Mass.
Chicago Mfg. & Distributing Co., Chicago
Chicago Rawhide Mfg. Co., Chicago
Cincinnati Tool Co., Cincinnati, Ohio
*Cleveland Punch & Shear Works Co., Cleveland, O.
*Cleveland Twist Drill Co., Cleveland, O.
*Crafts Co., Arthur A., Boston, Mass.
Crescent Tool Co., Jamestown, N. Y.
Cunningham Co., M. E., Pittsburgh, Pa.
Dearborn Gage Co., Dearborn, Mich.
Dickerman Mfg. Co., H. E., Springfield, Mass.
*Disston & Sons, Inc., Henry, Tacony, Philadelphia, Pa.
Eclipse Counterbore Co., Detroit, Mich.
Electric Soldering Iron Co., Inc., Deep River, Conn.
Forsburg Mfg. Co., Bridgeport, Conn.
Gairing Tool Co., Detroit, Mich.
Goodrich Co., B. F., Akron, O.
*Greene Tweed & Co., N. Y. C.
Greenfield Tap & Die Corp., Greenfield, Mass.
*Hamilton Tool Co., Hamilton, O.
Knu-Vise Products Co., Detroit, Mich.
*Lufkin Rule Co., Saginaw, Mich.
Millers Falls Co., Greenfield, Mass.
Morse Twist Drill & Mach. Co., New Bedford, Mass.
*National Twist Drill & Tool Co., Detroit, Mich.
*Niagara Machine & Tool Wks., Buffalo, N. Y.
North Bros. Mfg. Co., Philadelphia, Pa.
Numberall Stamp & Tool Co., Huguenot Park, Staten Is., N. Y.
*Owatonna Tool Co., Owatonna, Minn.
Peck, Stow & Wilcox Co., Southington, Conn.
Pittsburgh Stencil & Tool Co., Pittsburgh
*Pratt & Whitney Div., Niles-Bement-Pond Co., Hartford, Conn.
Production Tool Co., Detroit, Mich.
*Producto Machine Co., Bridgeport, Conn.
*Racine Tool & Mach. Co., Racine, Wis.
*Scully-Jones & Co., Chicago
Service Machine Co., Elizabeth, N. J.
Severance Tool Mfg. Co., Saginaw, Mich.
*Slocomb Co., J. T., Providence, R. I.
Standard Tool Co., Cleveland, O.
Stanley Tools, New Britain, Conn.
*Thompson & Son Co., Henry G., New Haven, Conn.
*Union Twist Drill Co., Athol, Mass.
Victor Saw Works, Inc., Middletown, N. Y.
Wesson Co., Detroit, Mich.
Whitney Metal Tool Co., Rockford, Ill.
*Williams & Co., J. H., Buffalo, N. Y.

TOOLS, Lathe, Shaper and Planer

*American Tool Works Co., Cincinnati, O.
Apex Tool & Cutter Co., Shelton, Conn.
*Armstrong Bros. Tool Co., Chicago
Atlas Press Co., Kalamazoo, Mich.
*Carboloy Co., Detroit, Mich.
*Cincinnati Lathe & Tool Co., Oakley, Cincinnati
*Cleveland Twist Drill Co., Cleveland, O.
Colonial Broach Co., Detroit, Mich.
Columbia Tool Steel Co., Chicago
Detroit Tap & Tool Co., Detroit, Mich.
Eclipse Counterbore Co., Detroit, Mich.
Empire Tool Co., Detroit, Mich.
*Ex-Cell-O Corp., Detroit, Mich.
Fansteel Metallurgical Corp., N. Chicago, Ill.
*Firth-Sterling Steel Co., McKeesport, Pa.
*Gisholt Machine Co., Madison, Wis.
Gorham Tool Co., Detroit, Mich.
Haynes Stellite Co., Kokomo, Ind.
*Hendey Machine Co., Torrington, Conn.
*Illinois Tool Works, Chicago
*LeBlond Machine Tool Co., R. K., Cincinnati, O.
McKenna Metals, Latrobe, Pa.
*Michigan Tool Co., Detroit, Mich.
Millholland Sales & Mach. Co., Indianapolis, Ind.
*National Broach & Machine Co., Detroit
*O. K. Tool Co., Shelton, Conn.
*Pratt & Whitney Div., Niles-Bement-Pond Co., Hartford, Conn.
R. & L. Tools, Nicetown, Philadelphia
*Ready Tool Co., Bridgeport, Conn.
*Rivett Lathe & Grinder Inc., Boston, Mass.
*Scully-Jones & Co., Chicago
*Standard Electrical Tool Co., Cincinnati
*Starrett Co., L. S., Athol, Mass.
*Warner & Swasey Co., Cleveland, O.
Wesson Co., Detroit, Mich.
Western Tool & Mfg. Co., Springfield, O.
*Williams & Co., J. H., Buffalo, N. Y.

TOOLS, Portable Electric

Arcade Mfg. Co., Freeport, Ill.
*Black & Decker Mfg. Co., Towson, Md.
Chicago Pneumatic Tool Co., N. Y. C.
*Cincinnati Electrical Tool Co., Cincinnati, O.
Clark Electric Co., James, Jr., Louisville, Ky.
*Delta Mfg. Co., Milwaukee, Wis.
*Dumore Co., Racine, Wis.
Ferriot Bros., Akron, Ohio
Goodell-Pratt Co., Div. Millers Falls Co., Greenfield, Mass.
Hisey-Wolf Machine Co., Cincinnati, O.
Independent Pneumatic Tool Co., Chicago
Keystone Lubricating Co., Philadelphia
Louisville Electric Mfg. Co., Louisville, Ky.
McGonegal Mfg. Co., E. Rutherford, N. J.
Mall Tool Co., Chicago
Millers Falls Co., Greenfield, Mass.
Milwaukee Elec. Tool Corp., Milwaukee
Rotor Tool Co., Cleveland, O.
Signal Elec. Mfg. Co., Menominee, Mich.
Skilsaw, Inc., Chicago, Ill.
*Standard Elec. Tool Co., Cincinnati
Stanley Electrical Tool Div., The Stanley Works, New Britain, Conn.
Syntron Co., Homer City, Pa.
U. S. Electrical Tool Co., Cincinnati, O.
Van Dorn Electric Tool Co., Towson, Md.
*Walker-Turner Co., Plainfield, N. J.
Wodack Electric Tool Corp., Chicago, Ill.

TOOLS, Portable Pneumatic

Chambersburg Engrg. Co., Chambersburg, Pa.
Chicago Pneumatic Tool Co., N. Y. C.
Cleveland Pneumatic Tool Co., Cleveland, O.
Independent Pneumatic Tool Co., Chicago
Ingersoll-Rand Co., N. Y. C.
Keller, William H., Inc., Grand Haven, Mich.
*M-B Products, Detroit, Mich.
Monnier Bros., Inc., Algonac, Mich.
Onsrud Machine Works, Inc., Chicago
Rotor Tool Co., Cleveland, O.
Schramm, Inc., West Chester, Pa.
Sheldon Machine Co., Chicago
*Standard Electrical Tool Co., Cincinnati

TORCHES, Gas-Cutting & Welding

*Air Reduction Sales Co., N. Y. C.
Bastian-Blessing Co., Chicago
Linde Air Products Co., N. Y. C.
National Cylinder Gas Co., Chicago

TRAILERS, Factory, Warehouse, etc.

*Allis-Chalmers Mfg. Co., Milwaukee, Wis.
All Steel Welded Truck Corp., Rockford, Ill.
*American Car & Foundry Co., N. Y. C.
Baker-Raulang Co., Cleveland, O.
Clark Equip. Co., Battle Creek, Mich.
Crescent Truck Co., Lebanon, Pa.
Easton Car & Const. Co., Easton, Pa.
Elwell-Parker Elec. Co., Cleveland, O.
Lansing Co., Lansing, Mich.
Lewis-Shepard Sales Co., Watertown, Mass.
Mercury Mfg. Co., Chicago
Service Caster & Truck Co., Albion, Mich.
Yale & Towne Mfg. Co., Philadelphia

TRANSMISSIONS, Hydraulic

American Engrg. Co., Philadelphia, Pa.
*Barnes Co., W. F. & John, Rockford, Ill.
Elmes Engrg. Wks., Chas. F., Chicago
*Ex-Cell-O Corp., Detroit, Mich.
Hydro-Power Systems, Inc., Pittsburgh, Pa.

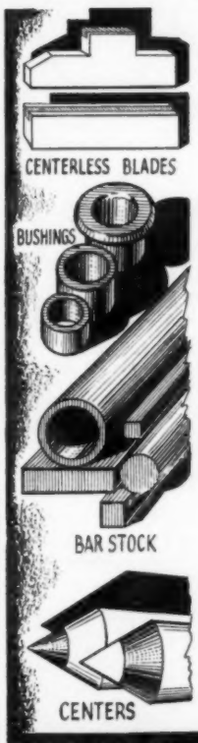
SOLVE "YOUR" WEAR PROBLEMS

with

TALIDE

TUNGSTEN CARBIDE

WEAR • METAL



CENTERLESS GRINDER BLADES give 10-30 times longer life, reduce replacement costs, and do not mark or score work when Talide-Tipped with Tungsten Carbide strips.

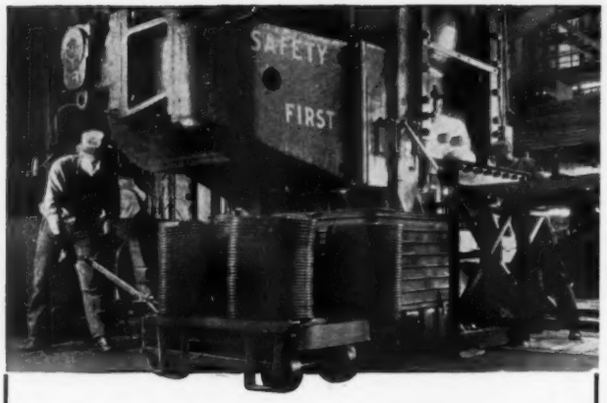
DRILL JIG BUSHINGS, Sizing Bushings, and Gages made of Solid Talide maintain their size 25-50 times longer. They take a mirror-finish and are not affected by changes in room temperature.

BAR STOCK of Solid Tungsten Carbide is available *in any size or length* and in all practical shapes such as strips, rods, bars, tubes and rings.

LATHE & GRINDER CENTERS tipped with Talide outlast hardened steel centers by 50 times, and permit faster speeds without danger of burning or galling.

Send blueprints or detailed information for engineering data and prices

METAL CARBIDES CORPORATION
YOUNGSTOWN, OHIO



A BARRETT DOES A BETTER JOB

Industry was sold on the Lift-truck System of materials handling long ago. Sold when it discovered the savings in time and money accompanying the System.

Today, Industry prefers BARRETT Lift-trucks because it has found that they lift easier, operate faster, last longer.

To prove our claims, we'll send a BARRETT Lift-truck and two Skids for a 15-day FREE TRIAL. Use this equipment in your plant under your working conditions—then YOU judge its performance.

BARRETT

BARRETT-CRAVENS CO.

3269 West 30th Street Chicago, Illinois

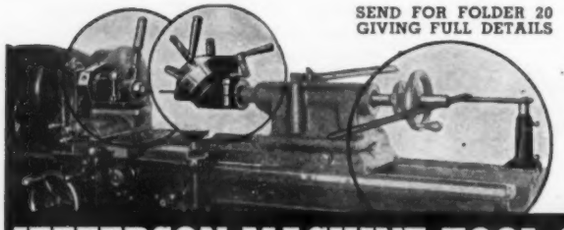
Representatives in all large cities.

NEWS...FOR ALL YOU SHORT-HANDED MACHINE SHOPS!

YOUR PRESENT OPERATORS CAN DO TWICE THE WORK WITH JEFFERSON ATTACHMENTS

Whether or not you've begun to feel the pinch which is putting a premium on skilled labor, you'll want to investigate this quick, low-cost way of substantially increasing the productiveness of your present working staff. JEFFERSON *Tail-Stock* and *Tool-Post Turrets* can be applied to all your regular engine lathes in a matter of seconds, immediately converting them into "full fledged" turret lathes, capable of handling a variety of machining operations without stopping the lathe or shifting belts. Also our *Adjustable Pull Feed* attachment saves using the hand wheel, thereby still further increasing operating speed. Can be bought singly, if desired.

SEND FOR FOLDER 20 GIVING FULL DETAILS



JEFFERSON MACHINE TOOL CO.

W. Fourth, Cutter, & Sweeney Sts., Cincinnati, Ohio

WHERE-TO-BUY DIRECTORY

** Indicates further information to be found in advertising pages.*

TRANSMISSIONS, Hydraulic (Cont.)
*Oilgear Co., Milwaukee, Wis.
*Sundstrand Mach. Tool Co., Rockford, Ill.
*Vickers, Inc., Detroit, Mich.

TRANSMISSIONS, Mech. Variable-Speed
*Allis-Chalmers Mfg. Co., Milwaukee, Wis.
Berkeley Equipment Co., Corry, Pa.
Boston Gear Works, Inc., N. Quincy, Mass.
Briggs & Stratton Corp., Milwaukee
Columbia Vari-Speed Co., Wheaton, Ill.
*Continental Machines, Inc., Minneapolis
*Cullman Wheel Co., Chicago, Ill.
Dodge Mfg. Corp., Mishawaka, Ind.
*Earle Gear & Machine Co., Philadelphia
Foote Gear Wks., Inc., Cicero, Ill.
*Ganschow Gear Co., Chicago
Ideal Commutator Dresser Co., Sycamore, Ill.
Lenney Machine & Mfg. Co., Warren, O.
Lewellen Mfg. Co., Columbus, Ind.
Lima Armature Works, Lima, O.
Link-Belt Co., Philadelphia, Pa.
Morse Chain Co., Ithaca, N. Y.
Palmer-Bee, Inc., Detroit, Mich.
Pittsburgh Gear & Machine Co., Pittsburgh, Pa.
Reeves Pulley Co., Columbus, Ind.
Smith Power Transmission Co., Cleveland, O.
Speedmaster Co., Minneapolis, Minn.
Stephens-Adamson Mfg. Co., Aurora, Ill.
Sterling Elec. Motors Inc., Los Angeles
U. S. Elec. Motors, Inc., Los Angeles
Western Mfg. Co., Detroit, Mich.
*Westinghouse Elec. & Mfg. Co., E. Pittsburgh, Pa.

TROLLEYS, TRACKS & TRAMWAYS, Overhead
American MonoRail Co., Cleveland, O.
*American Steel & Wire Co., Cleveland, O.
Bartlett & Snow Co., C. O., Cleveland, O.
Broderick & Bascom Rope Co., St. Louis, Mo.
Chain Belt Co., Milwaukee, Wis.
Chisholm-Moore Hoist Corp., Tonawanda, N. Y.
Cleveland Crane & Engineering Co., Wickliffe, O.
Coffing Hoist Co., Danville, Ill.
Conco Engrg. Works, Mendota, Ill.
Cullen-Friestedt Co., Chicago, Ill.
Curtis Pneumatic Machinery Co., St. Louis, Mo.
Euclid Crane & Hoist Co., Euclid, O.
Ford Chain Block Div. Am. Chain & Cable Co., Inc., Philadelphia, Pa.
Harnischfeger Corp., Milwaukee, Wis.
Harrington Co., Philadelphia, Pa.
Jeffrey Mfg. Co., Columbus, O.
Leschen, A., & Sons Rope Co., St. Louis, Mo.
Link-Belt Co., Caldwell-Moore Plant, Chicago
Louden Machinery Co., Fairfield, Ia.
Mathews Conveyor Co., Ellwood City, Pa.
Palmer-Bee Co., Detroit, Mich.
Philadelphia Tramrail Co., Philadelphia
Reading Chain & Block Corp., Reading, Pa.
Robbins & Myers, Inc., Hoist & Crane Div., Springfield, O.
*Round & Son, David, Cleveland, O.
Shaw-Box Crane & Hoist Div., Muskegon, Mich.
Stanley Works, New Britain, Conn.
Union Mfg. Co., New Britain, Conn.
*Wright Mfg. Div. Am. Chain & Cable Co., Inc., York, Pa.
Yale & Towne Mfg. Co., Philadelphia

TRUCKS & TRACTORS, Gas & Electric
*Allis Chalmers Mfg. Co., Milwaukee, Wis.
Automatic Transportation Co., Chicago
Baker-Raulang Co., Cleveland, O.
*Barrett-Cravens Co., Chicago
Canton Fdry. & Mach. Co., Cleveland, O.
Caterpillar Tractor Co., Peoria, Ill.
Clark Tructractor Div. Clark Equipment Co., Battle Creek, Mich.
Crescent Truck Co., Lebanon, Pa.
Easton Car & Construction Co., Easton, Pa.
Elwell-Parker Electric Co., Cleveland, O.
Lansing Co., Lansing, Mich.
Lewis-Shepard Sales Corp., Watertown, Mass.
Mercury Mfg. Co., Chicago
*Round & Son, David, Cleveland, O.
*Savage Co., W. J., Knoxville, Tenn.
Towmotor Co., Cleveland, O.
*Wright-Hibbard Industrial Truck Co., Phelps, N. Y.
Yale & Towne Mfg. Co., Philadelphia, Pa.

TRUCKS, Hand
All Steel Welded Truck Corp., Rockford, Ill.
Automatic Transportation Co., Chicago
Baker-Raulang Co., Cleveland, O.
*Barrett-Cravens Co., Chicago
Easton Car & Construction Co., Easton, Pa.
Fairbanks Co., N. Y. C.
Lewis-Shepard Sales Corp., Watertown, Mass.
Lyon Iron Works, Greene, N. Y.
Metzgar Co., Grand Rapids, Mich.
Morse Mfg. Co., Syracuse, N. Y.
Palmer-Bee Co., Detroit, Mich.
Sabin Machine Co., Cleveland, O.
Service Caster & Truck Co., Albion, Mich.
*Standard Pressed Steel Co., Jenkintown, Pa.
Union Metal Mfg. Co., Canton, O.
Yale & Towne Mfg. Co., Philadelphia, Pa.

TURNBUCKLES
*Bethlehem Steel Co., Bethlehem, Pa.
*Carnegie-Illinois Steel Corp. Subsidiary U. S. Steel Corp.), Pittsburgh
Republic Steel Corp., Cleveland, O.

TURRETS, Tool-post & Tailstock
Atlas Press Co., Kalamazoo, Mich.
Colwell, S. G., Providence, R. I.
*Gisholt Machine Co., Madison, Wis.
*Jefferson Machine Tool Co., Cincinnati, O.
McCrosky Tool Corp., Meadville, Pa.
*Specialties Mfg. Co. Inc., Bloomfield, N. J.
Stark Tool Co., Waltham, Mass.

UPSETTERS (See Forging Machines)

USED MACHINERY (See Classified Index, Searchlight Section)

V BELT Lacings
Shippert Mfg. Co., Dixon, Ill.

VALVES, Air-Control
Ace Valve Co., N. Y. C.
*Atkins & Co., E. C., Indianapolis, Ind.
*Barber-Colman Co., Rockford, Ill.
Binks Mfg. Co., Chicago
Bristol Co., Waterbury, Conn.
Crane Co., Chicago
Curtis Pneumatic Machinery Co., St. Louis, Mo.
Foxboro Co., Foxboro, Mass.
Hanna Engrg. Works, Chicago
Homestead Valve Mfg. Co., Coraopolis, Pa.
Hannifin Mfg. Co., Chicago
Hunt & Son, C. B., Salem, O.
Imperial Brass Mfg. Co., Chicago
Jenkins Bros., N. Y. C.
*Littell Machine Co., F. J., Chicago
Logansport Machine, Inc., Logansport, Ind.
Lukenheimer Co., Cincinnati, O.
Nicholson & Co., W. H., Wilkes-Barre, Pa.
Norgren Co., C. A., Denver, Colo.
Northern Engrg. Works, Detroit, Mich.
Ohio Brass Co., Mansfield, O.
Ross Operating Valve Co., Detroit, Mich.
Schrader's Son, A., Div. of Scovill Mfg. Co., Brooklyn, N. Y.
Skinner Chuck Co., New Britain, Conn.
Stewart-Warner Corp., Chicago
Tagliabue Mfg. Co., C. J., Brooklyn, N. Y.
Taylor Instrument Cos., Rochester, N. H.
Tomkins-Johnson Co., Jackson, Mich.
Trane Co., La Crosse, Wis.

VALVES, Hydraulic
Albright Equipment Co., Pittsburgh, Pa.
*Baldwin-Southwark Corp., Philadelphia
*Barnes Co., W. F. & John, Rockford, Ill.
Blackhawk Mfg. Co., Milwaukee, Wis.
Chapman Valve Mfg. Co., Indian Orchard, Mass.
Crane Co., Chicago
Elmes Engrg. Wks., Chas. F., Chicago
Galland-Henning Mfg. Co., Milwaukee, Wis.
Homestead Valve Mfg. Co., Coraopolis, Pa.
Hunt & Son, C. B., Salem, O.
Hydro-Power Systems, Inc., Pittsburgh
*LeMaire Tool & Mfg. Co., Dearborn, Mich.
Logansport Machine, Inc., Logansport, Ind.
Morin Mfg. Co., Holyoke, Mass.
Nicholson & Co., W. H., Wilkes-Barre, Pa.
*Oilgear Co., Milwaukee, Wis.

WHERE-TO-BUY DIRECTORY

** Indicates further information to be found in advertising pages.*

Pittsburgh Valve Fdry. & Construction Co., Pittsburgh, Pa.
*Racine Tool & Machine Co., Racine, Wis.
Robertson Co., John, Brooklyn, N. Y.
*Sundstrand Machine Tool Co., Rockford, Ill.
Trane Co., La Crosse, Wis.
*Vickers, Inc., Detroit, Mich.
*Watson-Stillman Co., Roselle, N. J.

VISES, Air-Operated
Champion Blower & Forge Co., Lancaster, Pa.
Hannifin Mfg. Co., Chicago
Knu-Vise Products Co., Inc., Detroit
Logansport Machine Inc., Logansport, Ind.
Ross Operating Valve Co., Detroit, Mich.
Skinner Chuck Co., New Britain, Conn.
Tomkins-Johnson Co., Jackson, Mich.

VISES, Machine
*Armstrong-Blum Mfg. Co., Chicago
*Armstrong Bros. Tool Co., Chicago
Athol Machine & Foundry Co., Athol, Mass.
*Brown & Sharpe Mfg. Co., Providence, R. I.
Cardinal Machine Co., Inc., Glendale, Calif.
Champion Blower & Forge Co., Lancaster, Pa.
Chicago Tool & Engrg. Co., Chicago
Chicago Wheel & Mfg. Co., Chicago
*Cincinnati Milling Machine Co., Cincinnati
*Cincinnati Planer Co., Oakley, Cincinnati
*Cincinnati Shaper Co., Cincinnati
Cochrane-Bly Co., Rochester, N. Y.
Columbia Machine Tool Co., Hamilton, O.
Columbian Vise Mfg. Co., Cleveland, O.
Covel Mfg. Co., Benton Harbor, Mich.
*Desmond-Stephan Mfg. Co., Urbana, O.
*Foster Machine Co., Elkhart, Ind.
Gould & Eberhardt, Irvington, N. J.
*Graham Mfg. Co., Providence, R. I.
Greenfield Tap & Die Corp., Greenfield, Mass.
Hannifin Mfg. Co., Chicago
*Hartford Special Machinery Co., Hartford, Conn.
*Hendey Machine Co., Torrington, Conn.
*Johnson Tool Co., East Providence, R. I.
*Kearney & Trecker Corp., Milwaukee
*Knight Machinery Co., W. B., St. Louis, Mo.
Knu-Vise Products Co., Detroit, Mich.
*L. W. Chuck Co., Toledo, O.
Logansport Machine Inc., Logansport, Ind.
Miller & Crowingshield, Greenfield, Mass.
Modern Machine Tool Co., Jackson, Mich.
North Bros. Mfg. Co., Philadelphia, Pa.
Plunket Machine Co., J. E., Chicago, Ill.
*Pratt & Whitney Div. Niles-Bement-Pond Co., Hartford, Conn.
Procunier Safety Chuck Co., Chicago
*Producto Machine Co., Bridgeport, Conn.
Reed Mfg. Co., Erie, Pa.
Royersford Fdry. & Mach. Co., Inc., Royersford, Pa.
Sheldon Machine Co., Chicago, Ill.
Skinner Chuck Co., New Britain, Conn.
U. S. Automatic Box Machinery Co., Roslindale, Mass.
U. S. Tool Co., Ampere, N. J.
Wesson Co., Detroit, Mich.
*Williams & Co., J. H., Buffalo, N. Y.
Zernickow Co., O., N. Y. C.

VISES, Machinists' Bench
Athol Machine & Foundry Co., Athol, Mass.
*Brown & Sharpe Mfg. Co., Providence, R. I.
*Cincinnati Milling Machine Co., Cincinnati
Columbian Vise Mfg. Co., Cleveland, O.
*Desmond-Stephan Mfg. Co., Urbana, O.
*Frav Machine Tool Co., Glendale, Calif.
Hollands Mfg. Co., Erie, Pa.
*New Britain Gridley Machine Co., New Britain, Conn. (Stands)
North Bros. Mfg. Co., Philadelphia, Pa.
Parker Co., Charles, Meriden, Conn.
Prentiss Vise Co., N. Y. C.
Reed Mfg. Co., Erie, Pa.
Wesson Co., Detroit, Mich.
Western Tool & Mfg. Co., Springfield, O.
*Wiedemann Machine Co., Philadelphia

WASHERS, Lock
American Nut & Bolt Fastener Co., Pittsburgh
Beall Tool Co., East Alton, Ill.
Butcher & Hart Mfg. Co., Toledo, O.
Eaton Mfg. Co., Massillon, O.
Kantlink Spring Washers Mfgrs., Chicago, Ill.
National Lock Washer Co., Newark, N. J.
Palnut Co., Irvington, N. J.
Philadelphia Steel & Wire Corp., Germantown, Philadelphia
Positive Lock Washer Co., Newark, N. J.
*Shakeproof Lock Washer Co., Chicago
Wrought Washer Mfg. Co., Milwaukee

WASHING & DRYING, Machines (See METAL-CLEANING EQUIPMENT)

WELDERS, Arc
*Air Reduction Sales Co., N. Y. C.
*Allis-Chalmers Mfg. Co., Milwaukee, Wis.
Bear Mfg. Co., Rock Island, Ill.
Comet Products Co., Chappaqua, N. Y.
Commonwealth Mfg. Corp., Cincinnati, O.
Eisler Engrg. Co., Newark, N. J.
Ergolyte Mfg. Co., Phila., Pa.
*Federal Mach. & Welder Co., Warren, O.
General Electric Co., Schenectady, N. Y.
Giant Grip Mfg. Co., Oshkosh, Wis.
Hampton Electric Tool Co., Edgewood, Pittsburgh, Pa.
Harnischfeger Corp., Milwaukee, Wis.
Hobart Bros. Co., Troy, O.
Lee & Son, K. O., Inc., Aberdeen, S. D.
Lincoln Electric Co., Cleveland, O.
Marquette Mfg. Co., Minneapolis, Minn.
Miller Electric Mfg. Co., Appleton, Mass.
Ohio Brass Co., Mansfield, O.
Owen-Dyneto Corp., Syracuse, N. Y.
Owen Elec. Mfg. Co., Fayetteville, N. C.
Pier Equipment Mfg. Co., Benton Harbor, Mich.
Roth Welding Engrg. Co., Detroit, Mich.
Taylor-Winfield Co., Warren, O.
Una Welding Co., Cleveland, O.
*Westinghouse Elec. & Mfg. Co., E. Pittsburgh, Pa.
Wilson Welder & Metals Co., N. Y. C.

WELDERS, Butt
Eisler Engrg. Co., Newark, N. J.
Federal Mach. & Welder Co., Warren, O.
Grob Bros., Grafton, Wis.
Laidlaw, Inc., Wm., Belmont, N. Y.
Martin Electric Co., Detroit, Mich.
*Ohio Machine Tool Co., Kenton, O.
Taylor Hall Welding Corp., Worcester, Mass.
Taylor-Winfield Corp., Warren, O.
Thomson-Gibb Electric Welding Co., Lynn, Mass.

WELDERS, Flash
Federal Mach. & Welder Co., Warren, O.
Martin Electric Co., Detroit, Mich.
Mesta Machine Co., Pittsburgh, Pa.
*Ohio Machine Tool Co., Kenton, O.
Swift Electric Welder Co., Detroit, Mich.
Taylor Hall Welding Corp., Worcester, Mass.
Taylor-Winfield Corp., Warren, O.
Thomson-Gibb Electric Welding Co., Lynn, Mass.

WELDERS, Gun
Martin Electric Co., Detroit, Mich.
Nelson, Ted, Vallejo, Calif.
Progressive Welder Co., Detroit, Mich.
Swift Electric Welder Co., Detroit, Mich.
Thomson-Gibb Elec. Welding Co., Lynn, Mass.

WELDERS, Seam
Eisler Engrg. Co., Newark, N. J.
Expert Welding Machine Co., Detroit, Mich.
Federal Mach. & Welder Co., Warren, O.
Martin Electric Co., Detroit, Mich.
*Ohio Machine Tool Co., Kenton, O.
Swift Electric Welder Co., Detroit, Mich.
Taylor Hall Welding Corp., Worcester, Mass.
Taylor-Winfield Corp., Warren, O.
Thomson-Gibb Electric Welding Co., Lynn, Mass.

WELDERS, Spot
Acme Electric Welder Co., Huntington Park, Calif.
American Electric Fusion Corp., Chicago
Eisler Engrg. Co., Newark, N. J.
Electric Arc Cutting & Welding Co., Newark, N. J.
Federal Mach. & Welder Co., Warren, O.
Harvey Machine Co., Los Angeles, Calif.
Martin Electric Co., Detroit, Mich.
*Ohio Machine Tool Co., Kenton, O.
Pier Equipment Mfg. Co., Benton Harbor, Mich.
Progressive Welder Co., Detroit, Mich.
Roth Welding Engrg. Co., Detroit, Mich.
Swift Electric Welder Co., Detroit, Mich.
Taylor Hall Welding Corp., Worcester, Mass.
Taylor-Winfield Co., Warren, O.
Thomson-Gibb Electric Welding Co., Lynn, Mass.

WELDING ACCESSORIES
Clark Controller Co., Cleveland, O.
Cullen Friestedt Co., Chicago, Ill.

WELDING CONTROLS
Weltronic Corp., Detroit, Mich.

WELDING RODS
*Air Reduction Sales, N. Y. C.
*Allegheny-Ludlum Steel Corp., Brecknbridge, Pa.
*Aluminum Co. of America, Pittsburgh
American Brass Co., Waterbury, Conn.
American Manganese Steel Div. of Amer. Brake Shoe & Fdry. Co., Chicago Hts., Ill.
*American Steel & Wire Co., Cleveland, O.
Ampco Metal, Inc., Milwaukee, Wis.
*Atkins & Co., E. C., Indianapolis, Ind.
Colmonoy, Inc., Los Nietos, Calif.
Compressed Industrial Gases Inc., Chicago
Crucible Steel Co., N. Y. C.
Driver-Harris Co., Harrison, N. J.
Fansteel Metallurgical Corp., No. Chicago, Ill.
Harnischfeger Corp., Milwaukee, Wis.
Haynes Stellite Co., Kokomo, Ind.
Hobart Bros. Co., Troy, O.
International Nickel Co. Inc., N. Y. C.
Lincoln Electric Co., Cleveland, O.
Linde Air Products Co., N. Y. C.
McKay Co., Pittsburgh, Pa.
Metal & Thermit Corp., N. Y. C.
National Cylinder Gas Co., Chicago
Ohio Brass Co., Mansfield, O.
Page Steel & Wire Div., Am. Chain & Cable Co., Monessen, Pa.
*Pittsburgh Steel Co., Pittsburgh
Revere Copper & Brass Corp., N. Y. C.
Roebling's Sons Co., John A., Trenton, N. J.
*Ryerson & Son, Jos. T., Chicago
Stoody Co., Whittier, Calif.
Una Welding Co., Cleveland, O.
*Westinghouse Elec. & Mfg. Co., E. Pittsburgh, Pa.
Wickwire Spencer Steel Co., N. Y. C.

WHEELS, Grinding & Polishing
*Abrasive Co., Philadelphia, Pa.
Allison Co. (Disks), Bridgeport, Conn.
*Bakelite Corp., N. Y. C.
*Bay State Abrasive Products Co., Westboro, Mass.
Besly & Co., Charles H., Chicago
*Blanchard Machine Co., Cambridge, Mass.
Bridgeport Safety Emery Wheel Co., Bridgeport, Conn.
Carborundum Co., Niagara Falls, N. Y.
*Cincinnati Milling Machine Co., Cincinnati, O.
*Cortland Grinding Wheels Corp., Chester, Mass.
deSanno & Son, Inc., A. P., Phoenixville, Pa.
*Gardner Machine Co., Beloit, Wis.
General Plastics, Inc., N. Tonawanda, N. Y.
Hanchett Mfg. Co., Big Rapids, Mich.
Hanson-Van Winkle-Munning Co., Matawan, N. J.
Macklin Co., Jackson, Mich.
Madison-Kipp Corp., Madison, Wis.
Mall Tool Co., Chicago
Mid-West Abrasive Co., Detroit, Mich.
*Norton Co., Worcester, Mass.
Porter Cable Machine Co., Syracuse, N. Y.
Prosser & Son, Thos., N. Y. C.
Safety Grinding Wheel & Mach. Co., Springfield, O.
Sterling Grinding Wheel Co., Tiffin, O.
Vitrified Wheel Co., Westfield, Mass.
*Western Tool & Mfg. Co., Springfield, O.

WINCHES & WINDLASSES
Chicago Pneumatic Tool Co., N. Y. C.
Chisholm-Moore Hoist Corp., Tonawanda, N. Y.
Cleveland Crane & Engrg. Co., Cleveland
Electro Lift, Inc., N. Y. C.
Shepard Niles Crane & Hoist Co., Montour Falls, N. Y.
Stephens-Adamson Mfg. Co., Ridway Ave., Aurora, Ill.
*Wright Mfg. Div., Am. Chain & Cable Co., York, Pa.

WINDERS, Coil
Electric Service Supplies Co., Philadelphia
Globe Tool & Engrg. Co., Dayton, O.
Ideal Commutator Dresser Co., Sycamore, Ill.
Seifert, Inc., E. R., Syracuse, N. Y.
Universal Winding Co., Providence, R. I.

WIRE, Spring
American Brass Co., Waterbury, Conn.
*Bethlehem Steel Co., Bethlehem, Pa.
Crucible Steel Co. of America, N. Y. C.
*Firth-Sterling Steel Co., McKeesport, Pa.
*Jones & Laughlin Steel Corp., Pittsburgh
*Page Steel & Wire Div. Amer. Chain & Cable Co. Inc., Monessen, Pa.
*Pittsburgh Steel Co., Pittsburgh
Revere Copper & Brass Inc., N. Y. C.

WIRES, Measuring
Fortney Mfg. Co., Newark, N. J.
Greenfield Tap & Die Corp., Greenfield, Mass.
*Pratt & Whitney Div. Niles-Bement-Pond Co., Hartford, Conn.
Van Keuren Co., Watertown, Mass.

WOODWORKING MACHINERY
American Saw Mill Machinery Co., Hackettstown, N. J.
Boice Crane Co., Toledo, O.
Defiance Machine Works, Defiance, O.
*Delta Mfg. Co., Milwaukee, Wis.
DeWalt Products Corp., Lancaster, Pa.
Francis Co., Chas. E. W., Bushville, Ind.
Ingersoll-Rand Co., New York, N. Y.
Greenlee Bros. & Co., Rockford, Ill.
*Mattison Machine Works, Rockford, Ill.
Oliver Machinery Co., Grand Rapids, Mich.
*Walter Turner Co., Plainfield, N. J.

WRENCHES (see TOOLS, Hand)

X-RAY INSPECTION EQUIPMENT
General Electric X-Ray Corp., Chicago, Ill.
St. John X-Ray Service Corp., L. I. City, N. Y.
Westinghouse X-Ray Co., L. I. City, N. Y.

NATIONAL DEFENSE SAYS:
"Full Speed Ahead!"

Our QUADRIDEX Turret Lathe and Engine Lathe tailstock turrets and QUADRIDEX Micrometer Stops will increase the capacity of any engine or Turret Lathe four fold. QUADRIDEX Tailstock Turret sells for $12.00. QUADRIDEX Micrometer Stop sells for $15.00.

Write for descriptive matter.

Specialties Manufacturing Company, Inc.

Dept. AM **35 Farrand St., Bloomfield, N. J.**

Write for Catalog of

HOBART ArcWelders

. . . and see how easy you can increase production! Welds easier; faster; better! Ask for liberal trial.

Hobart Bros. Co., Box AM-11, Troy, O.

ALPHABETICAL INDEX TO ADVERTISERS

Abrasive Company 235
Abrasive Machine Tool Co. 420
Adams Co. 318
Air Reduction Sales Co. 295
Ajax Mfg. Co. 260, 261
Allegheny Ludlum Steel Corp. 229
Allen Mfg. Co. 358
Allis-Chalmers Mfg. Co. 54, 55
Aluminum Co. of America 348, 349
American Brake Shoe & Foundry Co. 358
American Broach & Machine Co. 138
American Car & Foundry Co. 290
American Chain & Cable Co., Inc. 135, 291, 330
American Gas Furnace Co. 268
American Metal Hose Branch American Brass Co. 332
American Optical Co. 326
American Society Tool Engineers 346k
American Swiss File & Tool Co. 208
American Tool Works Co. 20, 21
Ames Co., B. C. 418
Auker Holth Mfg. Co. (Airgrip Chuck Div.) 409
Armstrong-Blum Mfg. Co. 16
Armstrong Bros. Tool Co. 17
Arter Grinding Machine Co. 106
Atkins & Co., E. C. 48
Atlantic Machinery Corp. 427
Automatic Transportation Co. 327
Axelson Mfg. Co. 118, 119
Avey Drilling Machine Co. 129

Bakelite Corp. 352
Baldwin-Southwark Div. of Baldwin Locomotive Works 252, 253
Barber Colman Co. 59
Bardons & Oliver, Inc. 115
Barnes Co., W. F. & John 121
Barnes Drill Co. 124
Barret Cravens Co. 440
Baumbach Mfg. Co., E. A. 413
Bay State Abrasive Products Co. 225
Bearings Co. of America 360
Bethlehem Steel Co. 230
Billstrom Inc., Nels J. 415
Black & Decker Mfg. Co. 214
Blanchard Machine Co. 32
Blank & Buxton Machry. Co. 170
Bower Roller Bearing Co. 347
Boyar-Schultz Corp. 210
Boye & Emmes Machine Tool Co. 125
Bradford Machine Tool Co. 148
Braun Gear Corp. 320
Brown & Sharpe Mfg. Co. 62, 63, 202, 203
Brown Instrument Co. 289
Bryant Chucking Grinder Co. 29
Bryant Machinery & Engineering Co. 128
Buffalo Forge Co. 259
Bullard Co. 112, 113
Bunting Brass & Bronze Co. 344
Butterfield & Co. (Div. of Union Twist Drill) 34

Campbell, Andrew C. Div. American Chain & Cable Co. Inc. 135
Capewell Mfg. Co. 222
Carboloy Co. 199
Card Mfg. Co., S. W. 35
Carlton Machine Tool Co. 130
Carnegie-Illinois Steel Corp. 353
Carpenter Steel Co. 26, 27
Cincinnati Bickford Tool Co. 65
Cincinnati Electrical Tool Co. 160
Cincinnati Gear Co. 318
Cincinnati Gilbert Machine Tool Co. 415
Cincinnati Grinders, Inc. 12, 13
Cincinnati Lathe & Tool Co. 425
Cincinnati Milling Machine Co. 6, 7
Cincinnati Planer Co. 174
Cincinnati Shaper Co. 68
Cleerman Machine Tool Co. 128
Cleveland Automatic Machine Co. 30, 31
Cleveland Planer Co. 149
Cleveland Punch & Shear Works Co. 263
Cleveland Twist Drill Co. 205
Clover Mfg. Co. 224
Columbia Steel Corp. 353
Cone Automatic Machine Co. 40
Consolidated Machine Tool Corp. 60
Continental Machines, Inc. 346f
Cortland Grinding Wheels Co. 236
Coulter Machine Co., James 108
Crafts Co., Inc., Arthur A. 413
Cullman Wheel Co. 318
Cunningham Co., M. E. 436

Danly Machine Specialties Inc. 429
Davis & Thompson Co. 415, 426
Davis Keyseater Co. 425
Dayton Rogers Mfg. Co. 258
De Laval Separator Co. 296
Delta Mfg. Co. 161
Desmond-Stephan Mfg. Co. 413
Detroit Power Screw Driver Co. 434
Die Supply Co. 429
Disston & Sons, Inc., Henry 211
Douglas Machinery Co. Inc. 168

Dow Chemical Co. 351
Dumore Co. 159
Dykem Co. 404

Earle Gear & Machine Co. 320
Eastern Machine Screw Corp. 402
Electric Furnace Co. 288
Errington Mechanical Laboratory 422
Etna Machine Co. 255
Etco Tool Co. 224
Evans Flexible Reamer Co. 431
Excello Corp. 141

Fairbanks Morse & Co. 362
Famco Machine Co. 430
Farrel-Birmingham Co., Inc. 322
Federal Bearings Inc. 50
Federal Products Corp. 216
Fellows Gear Shaper Co. 10, 11
Firth-Sterling Steel Co. 232
Fitchburg Grinding Machine Corp. 155
Foote Bros. Gear & Machine Corp. 317
Fosdick Machine Tool Co. 53
Foster Machine Co. 116, 117
Fray Machine Tool Co. 403

Gallmeyer & Livingston Co. 420
Gammons Holman Co. 432
Ganschow Gear Co. 322
Gardner Machine Co. ..... 3d Cover
Gear Grinding Machine Co. 143
Gear Specialties Inc. 320
General Machinery Corp. 111
Geometric Tool Co. 223
Gibraltar Equipment & Mfg. Co. 424
Giddings & Lewis Machine Tool Co. 41, 42, 43, 44
Giern & Anholtt Tool Co. 407
Gisholt Co. 52
Gleason Works 3
Gorton Machine Co., George 142
Goss & deLeeuw Machine Co. 408
Graham Mfg. Co. 420
Grant Gear Works 322
Grant Mfg. & Machine Co. 421
Gray Co., G. A. 173
Gray & Prior Machine Co. 424
Greene-Tweed & Co. 421
Grobet File Co. 222
Gwilliam Co. 405

Hamilton Tool Co. 414
Hammond Machinery Builders, Inc. 419
Hanson-Whitney Machine Co. 206, 207
Hardinge Brothers, Inc. 209
Hartford Special Machinery Co. 318, 423
Harvey Mfg. Co. 417
Haskins Co., R. G. 438
Heald Machine Co. ..... 2d Cover
Hendey Machine Co. 122
Henry & Wright Mfg. Co. 254
Hevi Duty Electric Co. 293
Hill-Acme Co. 164, 165
Hobart Bros. Co. 441
Holman Reamer Co. 432
Hones, Inc., Chas. A. 417
Howell Electric Co. 366
Huot Mfg. Co. 414

Illinois Tool Works 217
Indian White Eagle Engineering & Mach. Works 434
Ingersoll Steel & Disc Div., Borg-Warner 356
International Machine Tool Co. 22, 23

Jacobs Mfg. Co. 221
Janette Mfg. Co. 318
James Co., D. O. 321
Jefferson Machine Tool Co. 440
Johnson Bronze Co. 45
Johnson Machine Co., Carlyle 409
Johnson Tool Co. 421
Jones & Lamson Machine Co. 8, 9
Jones Machine Tool Works, Inc. 406
Junkin Safety Appliance Co. 421

Kantlink Spring Washer Mfgrs. 361
Kaufman Mfg. Co., L. J. 168
Kearney & Trecker Corp. 105
King Machine Tool Co. 61
Kingsbury Machine Tool Co. 126
Knight Machinery Co., W. B. 146

L-W Chuck Co. 409
Lamson & Session Co. 363
Landis Machine Co., Inc. 18, 19
Landis Tool Co. 39
La Pointe Machine Tool Co. 136, 137
LeBlond Machine Tool Co., R. K. 36, 37
Lees-Bradner Co. 28
Lehmann Machine Co. 114
Leland Gifford Co. 415
Le Maire Tool & Mfg. Co. 131, 416
Liberty Planer & Mfg. Co. 429

Linley Bros. Co. 433
Littell Machine Co., F. J. 262
Lodge & Shipley Machine Tool Co. 4, 5
Lucas Machine Tool Co. 406
Lufkin Rule Co. 346j

McCaskey Register Co. 38
McGraw-Hill Book Co. 170, 254
M.-B. Products Co. 420
Mallory & Co., Inc., P. R. 292
Marchant Calculating Machine Co. 346h
Marlin Rockwell Corp. 51
Mattison Machine Works 156
Mechanite Research Institute 334
Meisel Press Mfg. Co. 320
Metal Carbides Corp. 439
Michigan Tool Co. 74
Micromatic Hone Corp. 154
Millholland Machinery Co. 426
Mill Supplies 219
Mitts & Merrill 425
Modern Tool Wks. 132
Moline Tool Co. 132
Monarch Machine Tool Co. 24, 25
Morey Machinery Co., Inc. 120, 147
Motch & Merryweather Co. 163
Murchey Machine & Tool Co. 412

National Acme Co. 56, 57
National Broach & Machine Co. 140
National Machine Tool Co. 204
National Twist Drill & Tool Co. 411
Nebel Machine Tool Co. 426
New Britain-Gridley Machine Co. 94
Niagara Machine & Tool Works 256, 257
Nicholson File Co. 176
Niles Tool Works Co. 111
Noble & Westbrook Mfg. Co. 427
Norman-Hoffmann Bearings Corp. 64
Norton Co. 227, 228

O. K. Tool Co. 238
Oakite Products Inc. 294
Ohio Machine Tool Co. 169
Ohio Units Manufacturers 110
Oilgear Co. 139
Oliver Instrument Co. 171
Oslund Tool & Die Co. 424
Oster Mfg. Co. 437
Owatonna Tool Co. 431

Pacific Tool & Supply Co. 427
Page Steel & Wire Div. American Chain & Cable Co. Inc. 291
Peerless Machine Co. 150
Perkins Machine & Gear Co. 319
Philadelphia Gear Works 316
Pittsburgh Steel Co. (Seamless Tube Div.) 359
Porter McLeod Machine Tool Co. 162
Potter & Johnston Machine Co. 108
Pratt & Whitney Div. Niles-Bement-Pond Co. 46, 47
Precision Tool Co. 423
Producto Machine Co. 264

Racine Tool & Machine Co. 162
Railway Express Agency (Air Express Div.) 435
Randall & Stickney 418
Ready Tool Co. 423
Reed-Prentice Corp. 238
Reliance Elec. & Engineering Co. 325
Rivett Lathe & Grinder Inc. 166
Rockford Machine Tool Co. 172
Round & Sons, David 422
Ruby Chemical Co. 417
Ruthman Machinery Co. 431
Ryerson & Sons Inc., Jos. T. 346e

S.K.F. Industries Inc. 345
Savage Co., W. J. 428
Schatz Mfg. Co. 350
Scully Jones Co. 220
Scully Steel Products Co. 355
Sellers & Co., Inc., William 158
Seneca Falls Machine Co. 123
Shakeproof Lock Washer Co. 218
Sheffield Gage Corp. 346g
Shore Instrument & Mfg. Co. 424
Sidney Machine Tool Co. 107
Simmons Machine Tool Corp. 124
Simonds Saw & Steel Co. 231
Slocomb Co., J. T. 212, 213
Smith & Mills Co. 434
Snyder Tool & Engrg. Co. 151
Socony Vacuum Oil Co. Inc. 328, 329
Sommer & Adams Co. 168
South Bend Lathe Works 49
Specialties Mfg. Co. 441
Springfield Machine Tool Co. 109
Standard Oil Co. of Indiana 323, 324
Standard Pressed Steel Co. 322, 406
Starrett Co., L. S. 92
Strong Carlisle & Hammond Co. 360
Stuart Oil Co., D. A. 346d

Sun Oil Co. 298
Sundstrand Machine Tool Co. 144, 145
Surface Combustion Corp. 266

Taft-Peirce Mfg. Co. 134
Texas Co. 58
Thomas Hoist Co. 400
Thompson Grinder Co. 152, 153
Thompson & Son Co., Henry G. 346i
Timken Roller Bearing Co. ..... 4th Cover
Timken Roller Bearing Co. (Steel & Tubes Div.) 354
Tolhurst Div. American Machine & Metals, Inc. 331
Tomkins-Johnson Machine Co. 330
Torrington Co. 346i, 437

Union Twist Drill Co. 33
United States Drill Head Co. 422
United States Steel Corp. 353, 355
U. S. Steel Export Co. 353
Universal Engineering Co. 407

V & O Press Co. 416
Van Norman Machine Tool Co. 14, 15
Vascoloy-Ramet Corp. 234
Veeder Root Inc. 410
Vickers, Inc. 72
Victor Machinery Exchange 226

Wade Tool Co. 425
Walker Co., O. S. 157
Walker-Turner Co., Inc. 127
Waltham Machine Works 133
Waltham Watch Co. 428
Warner & Swasey Co. 66
Waterbury Steel Ball Co. 404
Watson-Stillman Co. 265
Wesche Electric Co., B. A. 346
Westinghouse Elec. & Mfg. Co. 364, 365
Wicaco Machine Works 167
Wiedemann Machine Co. 430
Williams & Co., J. H. 233
Wilson Mechanical Instrument Co. 424
Winter Brothers Inc. 201
Wood & Spencer Co. 438
Wright Mfg. Div., American Chain & Cable Co. 330
Wyckoff Drawn Steel Co. 357

Zeh & Hahneman Co. 262

■

SEARCHLIGHT SECTION

Classified Advertising

Classification	*Page*
BUSINESS OPPORTUNITIES.	399
CONTRACT WORK.	369-372
Acklin Stamping Co.	372
Ajax Iron Works.	369
American Shearer Mfg. Co.	370
Bethlehem Mfg. Co., Inc.	369
Bock Machine Co.	371
Buffalo Toy & Tool Works.	372
Carver Cotton Gin Co.	369
Continental Diamond Fibre Co.	372
G. M. Diehl Machine Works.	370
Dinsmore & Jager.	372
Doyle Machine & Tool Corp.	371
Eastern Tool & Mfg. Co.	372
Fidelity Machine Co.	371
General Die & Tool Co.	371
General Pattern Works.	370
Greist Mfg. Co.	370
H & H Tool & Mfg Co.	371
Emil Hensle Machine & Tool Works	371
A. H. Hyndman Co., Inc.	369
Indian White Eagle Eng. & Mach. Works	371
Kirk & Blum Mfg. Co.	370
Lincoln Machine Co.	371
M & M Manufacturing Corp.	370
Munson Mill Machinery Co.	371
A. H. Nilson Machine Co.	371
North Wales Machine Co.	369
Philadelphia Rust-Proof Co.	369
Phonograph Needle Mfg. Co.	372
Charles E. Reed Co.	371
St. John X-Ray Service, Inc.	369
Vilter Mfg. Co.	369
Worcester Pressed Steel Co.	372
EMPLOYMENT AGENCY.	398
PATENT ATTORNEY.	399
POSITIONS VACANT.	398
POSITIONS WANTED.	398
PROFESSIONAL SERVICES.	399
REAL ESTATE PROPERTY— National Industrial & Commercial Realty Exchange, Inc.	399
REPAIRING	399
USED SURPLUS EQUIPMENT 374-379,	399-400
ADVERTISERS' INDEX.	373
WANTED TO PURCHASE.	399